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DISEASES CAUSED BY BACTERIA AND FUNGI.

I. Roemmele, O. (1936). Ergebnisse über fünfjährige Galtforschung und Galtbekämpfung im Allgäu wie Versuche über das " künstliche Trockenstellen " der Kühe. [**Five Year's Research and Control of Mastitis in Algäu and of Artificial Drying of Cows**].—*Z. InfektKr. Haustiere.* **49.** 123-140. 2 tables. [4 refs.]

II. Seeleman. (1936). Staatlich gefördertes Galtbekämpfungsverfahren oder Galtbekämpfung nach Breidert ? [**Schemes for the Control of Mastitis**].—*Berl. tierärztl. Wschr.* **52.** 205-207. [1 ref.]

III. Starr, L. E., Prescott, T. H., & Huffman, Jane. (1936). **The Diagnosis of Mastitis.**—*J. Amer. vet. med. Ass.* **88.** 468-474. [13 refs.]

IV. Steck, W., Gygax, E., & Dachis, M. (1936). Experimentelle Untersuchungen über den Einfluss massiver Vakzination auf die Galtinfektion. [**Massive Vaccination against Mastitis**].—*Schweiz. Arch. Tierheilk.* **78.** 1-17. [6 refs.]

I. The author discusses the methods which he has found to be most effective in the control of mastitis. The farmer must co-operate in the eradication of the disease. As an aid to diagnosis on the farm Roemmele recommends the daily use of strip-cups and indicator papers, together with tasting and smelling the milk. The catalase and thybromol tests give more accurate results, but should only be used by a veterinary surgeon. Strict hygiene must be enforced. Only teat ointments of proved disinfectant properties should be used. Calves should not be allowed to suckle clean cows after drinking infected milk. In a case cited, in which mastitis was transmitted in this way, the period of incubation was two days.

The incidence of mastitis was found to increase with age. Of 1,200 cases, only five first-calf heifers were affected. The various factors which predispose to mastitis are discussed, and it is stated that the high resistance of goats to the disease is due to the higher acidity of their milk. Likewise, the udder of the cow becomes more susceptible as the lactation progresses, owing to the increasing pH of the milk.

In the treatment of mastitis the best results were obtained with " entozon", injected when the cow was dry or nearly so. For the artificial drying of cows, " entozon " in concentrations of 1 : 500 to 1 : 800 is effective, but should only be resorted to when other accepted methods have failed.

II. Seeleman criticizes the method advocated by BREIDERT [see this *Bull.* **6.** 301.] for the control of streptococcus mastitis. He finds from his own experiments that, although " weidnerit " solution has a high disinfectant action *in vitro*, it is definitely inferior to " entozon " as a chemotherapeutic substance for the treatment of mastitis. He also refers to " weidnerit-gel " as a teat ointment. The measures proposed by BREIDERT are, in Seeleman's opinion, too elaborate and too costly for practical application.

III. The authors found that with identical milk samples there was considerable variation in the results obtained when a number of different tests for the diagnosis of mastitis were employed. They regard manual examination of the udder and the brom-cresol purple paper tests as being more reliable than the other indirect tests for the detection of infected udders.

IV. The authors point out the difficulty of assessing the effect of vaccination on the course of mastitis in an infected herd. They think it possible, however, to obtain information on the value of the method by carrying out counts of the number of streptococci excreted in the milk by vaccinated and non-vaccinated cows. In this investigation ten animals in an infected herd of 25 cows were inoculated subcutaneously at five-day intervals with 5, 10, 20, 50 and 100 c.c. of a living 48-hour broth culture of a streptococcus isolated from the herd. Examination of the milk at regular intervals showed no difference in the numbers of organisms excreted by the two groups of animals. The authors conclude that vaccination did not affect the course of the disease in any way.—N. J. SCORGIE.

I. UDALL, D. H. (1936). **Bovine Mastitis.**—*J. Amer. vet. med. Ass.* **88.** 289-297. 1 table.

II. PULLINGER, E. J. (1935). **Mastitis Streptococci in Bulk Milk.**—*J. Dairy Res.* **6.** 369-382. 10 tables. [Numerous refs.]

III. —. (1936). **Mastitis Streptococci in Raw Milk.**—*Brit. med. J.* March 28th. 647-648. [1 ref.]

I. This report deals with the economic losses caused by mastitis, the methods of diagnosis, and the results obtained in New York in the control of the disease.

II. The author describes a technique for examining bulk milk, by cultural and microscopic means, for the presence of mastitis streptococci. Of 42 samples of " certified " milk examined, from 16 producers, 24 were found to be infected. Twelve of these herds were examined on three occasions during 15 months, and samples from only two of them were free from streptococci at every test. Similar results were obtained from " Grade A (T.T.) " milk. Of 54 samples from 24 producers, 42 were infected and, of 14 herds examined on three occasions, only two were found to be free at every test. In ordinary rail-tank milk, mastitis streptococci were found in every one of 58 samples. No streptococci were present after pasteurization by the official holder method.

Pullinger concludes that it is impossible to set up a standard count for haemolytic streptococci above which a producer might be penalized.

III. This annotation, after considering the results of Pullinger's work, draws attention to the unfortunate state of affairs in raw milk production, and emphasizes the necessity for eradicating tuberculosis, bovine contagious abortion and mastitis from dairy herds.—N. J. SCORGIE.

TROSSBACH, H. (1935). Welche Methoden der Laboratoriumsuntersuchungen gelten als die sichersten zur Erkennung des gelben Galtes und welche der heute geübten sind entbehrlich? [**Choice of Methods for Laboratory**

Diagnosis of Mastitis].—*Münch. tierärztl. Wschr.* **86.** 493-500 and 505-509. 9 tables. [19 refs.]

The author finds that no single test or combination of tests is efficient in 100 per cent. of cases for the diagnosis of mastitis. The most reliable method is a combined microscopic and cultural examination of the secretion ; this is reliable in 95 per cent. of cases. The use of other tests, such as the thybromol, chlorine or catalase tests, in conjunction with the above is unnecessary, as they do not increase the reliability of the method.—N. J. SCORGIE.

FARRELL, M. A. (1935). **Studies on the Respiratory Mechanism of the Streptococci.**—*J. Bact.* **29.** 411-435. 5 tables. [Numerous refs.]

From a study of 22 strains of streptococci, Farrell concludes that a dehydrase-peroxidase system depending upon a thermostable peroxidase and a thermolabile dehydrase mechanism, intimately connected, plays an important role in the respiration of streptococci. Catalase could not be demonstrated, nor could cytochrome or indophenol-oxidase. The oxygen uptake of washed suspensions was negligible. Whilst it was possible to demonstrate the dehydrogenation of many carbohydrates, other organic substances were not activated.—A. W. S.

POPPE, K. (1936). Drusestreptokokken bei Angina des Menschen. [**Strangles Streptococci in Human Angina**].—*Dtsch. tierärztl. Wschr.* **44.** 182-183.

A clinical description is recorded of a case of infection in a human being by an organism said to be identical with *Streptococcus equi*. No details regarding the bacteriological identification are recorded.—E. J. PULLINGER.

I. TAUBITZ. (1936). Die Blutfleckenkrankheit der Pferde im Heere und ihre Beziehung zur Druse und anderer Infektionskrankheiten. [**Statistical Study on Purpura Haemorrhagica**].—*Dtsch. tierärztl. Wschr.* **44.** 148-151.

II. HANCKE. (1936). Ein Beitrag zum Druseproblem in den Remonteämtern unter besonderer Berücksichtigung der Epidemiologie. [**Strangles in Remount Depots**].—*Ibid.* 155-158.

I. The author discusses at length the statistics of strangles and purpura haemorrhagica in the horses of the Prussian army between 1889 and 1914 and of the Reich army since 1921. The incidence of both diseases was roughly similar and the majority of cases of the latter followed attacks of strangles, though purpura was often observed in horses with no history of previous illness, and in horses previously affected with respiratory disease or wounds.

A review is given of the methods of treatment which have been tried. No specific drug has been of value, but some success and some failure have been reported with an antiserum against *Streptococcus equi*.

II. The author considers that faulty hygiene in the care of foals, and the results of the poor acclimatization powers of remounts transported to a strange locality, are of the greatest importance in the epidemiology of strangles. He is of the opinion that the main remedy lies in the province of genetics. New strains of horses bred from the most hardy types should be extensively reared in Germany, so as to provide good remount material. The Prussian Panje breed is considered to be particularly suitable.—J. E.

MAZZUCCHI, M. (1934). Il vaccino " Carbozoo ". [**The " Carbozoo " (Anthrax) Vaccine**].—*Clin. vet., Milano.* **57.** 789-794.

A general description of the " carbozoo " vaccine which consists of a saponinized culture [see this *Bull.* **2.** 197]. Inoculated animals show a marked reaction for

a few days after inoculation, and after ten to 12 days can withstand inoculation with a dose of virulent culture that kills control animals. The bacilli injected slowly disappear from the site of injection as the result of local reaction processes, leading to bacteriolysis and phagocytosis.—F. VEGLIA (TURIN).

I. BARTELS. (1936). Milzbrandschutzimpfungen mit der Lanolin-Vaccine der I.-G. Farben. [**Lanolin Vaccine against Anthrax**].—*Dtsch. tierärztl. Wschr.* **44.** 339-340. [2 refs.]

II. JÖHNK, M. (1936). Ueber Milzbrand. [**Anthrax**].—*Berl. tierärztl. Wschr.* **52.** 17-21. 3 graphs.

I. Figures are given indicating that anthrax lanolin vaccine probably has protective properties, though it seems doubtful whether protection lasts longer than four to six months.

II. Discussion of the epidemiology of anthrax, illustrated by clinical experience, including data regarding therapeutic measures found to be helpful. [Apart from therapeutic experience, no new information is reported].—E. J. P.

GOLDMANN, W. (1936). Untersuchungen über den Coli-Milzbrandantagonismus. [**Antagonism of** *Bact. coli* **to** *Bacillus anthracis*].—*Zlb. Bakt. I.* (*Orig.*). **136.** 345-352. 2 graphs. [18 refs.]

Growth curves of *B. anthracis* and *Bact. coli* have been worked out for pure and for mixed cultures of the two species. Results indicate that there is practically no logarithmic phase of development of *B. anthracis* in the mixed culture. A similar antagonistic effect is produced by *Pseudomonas pyocyanea* and *B. mycoides*. —E. J. PULLINGER.

SPANIER, P. (1935). Sur le mécanisme de la destruction du bacille tuberculeux et l'importance de ce phénomène dans l'immunité antituberculeuse. [**The Mechanism of the Destruction of Tubercle Bacilli in the Tissues**].—*Rev. Microbiol., Paris.* **1.** 573-580. [12 refs.]

In the course of a preliminary discussion on immunity in tuberculosis, the author points out that the most decisive role is played by the cellular reactions. These he discusses at length and states that the destruction of the bacillus is most marked in the liver. It is slowest and least pronounced in the lungs, whilst extracts of the pancreas, spleen and muscle tissue have a marked bacteriolytic action. Finally, the author discusses the bacteriolytic action of nucleic acid and observes that, *in vivo*, lysis of tubercle bacilli is intimately associated with cells having a rich nucleic composition.—GWILYM O. DAVIES.

SMITHBURN, K. C. (1935). **The Colony Morphology of Tubercle Bacilli. IV. The Influence of the pH of Culture Medium on Colony Form, Virulence and Serological Behavior.**—*Trans. nat. Tuberc. Ass. U.S.A. 31st ann. Meet.* pp. 161-165.

SMITHBURN, K. C. (1936). **The Colony Morphology of Tubercle Bacilli. V. Influence of the pH of the Culture Medium on Colony Form.**—*J. exp. Med.* **63.** 95-108. 2 plates, 2 tables, 3 charts. [17 refs.]

[For abst. of previous article of this series, see this *Bull.* **6.** 735].

It would appear that the pH of the medium on which tubercle bacilli are grown has a profound influence on the appearance of the resulting colonies. Growth on acid medium (pH 6·0) gives rise to a greater number of granular colonies and on media of pH 6·4 to 6·8 smooth glistening colonies predominate. The organism is less sensitive to alkaline media (pH 6·8 to 7·4) in which an intermediate veil-like

spreading colony variant develops. All three forms occur with human and bovine strains but only the rough and smooth with the avian type. The optimum temperature for the growth of smooth colonies varies slightly with the type. This colonial variation occurs in strains of low virulence as well as in strains of high virulence.

Cultures of the bovine strain grown at four different pH values were used for virulence tests in rabbits and these revealed the smooth variants to be the most virulent, the intermediate forms next, and the rough colonies the most attenuated. Similar comparisons with cultures of the human strain showed only slight differences and were not sufficient to be of any value.

In his immunological studies the author found that, by employing extracts of smooth colonies in the precipitin test, he was able to distinguish between the human and bovine types of tubercle bacilli.

The second paper is a more detailed account of the first.—GWILYM O. DAVIES.

BULLARD, J. F. (1936). **Tuberculosis in a Herd of Hogs with One Hundred Per Cent. Mortality.**—*J. Amer. vet. med. Ass.* **88.** 632-636. 1 table.

A herd comprising 12 sows and 68 other pigs died from tuberculosis before the latter were a year old. They were reared on the same land as 50 chickens and both pigs and chickens were fed on skim milk. *Post-mortem* examination of two of the pigs revealed tuberculous lesions in the head and mesenteric glands. Acid-fast bacilli were present and the inoculation of a rabbit, guinea pig, hen and pig indicated them to be bovine in type. Efforts to cultivate the organism on glycerin potato slants and Löffler's media failed.—GWILYM O. DAVIES.

STEWART, C. A. (1935). **Pathogenesis of Tuberculosis in Man. Certain Governing Principles and the Causal Relationship existing between Primary and Reinfection Types of the Disease.**—*Amer. J. Dis. Child.* **50.** 853-871. 7 tables. [16 refs.] [Abst. from abst. in *Bull. Hyg., Lond.* **11.** 197].

The author is of the opinion, in disagreement with the usual theory, that a previous attack of tuberculosis provides no protection against further infection. Of about 11,000 children (7,338 with negative and 4,087 with positive reactions) he found that more developed phthisis, and more died from consumption, among the tuberculin-sensitive than among the non-sensitive. The human body can deal fairly adequately with primary infection (the mortality in his series was 0·48 per cent.), but subsequent infection and special liability to phthisis result from it.

PULLINGER, E. J. (1936). **The Influence of Tuberculosis upon the Development of *Brucella abortus* Infection.**—*J. Hyg., Camb.* **36.** 456-466. 6 tables. [11 refs.]

The simultaneous inoculation of tubercle bacilli and of *Br. abortus* into guinea pigs usually resulted in the failure of the latter infection to become established, even when a heavy dose of brucella was administered. By using strains of the two organisms of varying virulence, different degrees of inhibition were demonstrable. It is suggested that the injection of tubercle bacilli stimulates a strong mononuclear cellular reaction usually capable of destroying the brucella. By inoculating the two infections into opposite thighs a similar inhibition was produced in about half the cases tested. This indicates that the cellular reaction is generalized in its action and is not entirely confined to the site of inoculation of tubercle bacilli.

Guinea pig inoculation for identifying the contamination of milk with *Br. abortus* is less reliable than was previously thought, on account of the inhibitory action exerted by tubercle bacilli and possibly by other unidentified bacteria which may contaminate milk samples.

I. KHALIFA, I. A. B. (1934). **Pasteurella in Animals and their Inter-Classification.**—*Bull. Minist. Agric. Egypt.* No. 147. pp. 36. 6 tables. [9 refs.] Cairo Bulâq : Govt. Press. [8vo] [P.T.5].

II. FINCHER, M. G. (1936). **Hemorrhagic Septicemia.**—*Cornell Vet.* **26.** 51-56.

III. BORNAND, M. (1936). Etude d'un bacille du groupe des septicémies hémorragiques (Bact. septicaemiae haemorrhagiae Huppe). [**Study of the Haemorrhagic Septicaemic Group of Bacteria**].—*Schweiz. Arch. Tierheilk.* **78.** 165-168. [In French].

I. The author considers the zoological method of classifying the pasteurellas as misleading and obsolete. A detailed study of 49 pathogenic strains from different species of animals has enabled him to demonstrate the occurrence of distinguishable varieties which make proper grouping possible. All the strains proved to be identical in their general morphological and cultural characteristics and, whilst their behaviour in most sugars was in agreement, they differed in mannite, arabinose and xylose. Many authors consider that these sugars give varying results.

Khalifa claims that the behaviour of the various pasteurella strains in these three sugars enables him to group the strains into three types.

TYPE A – all strains fermenting mannite and arabinose but not xylose. This included 19 strains, 10 from fowls, 3 from turkeys, 5 from ducks and one from rabbits. These were pathogenic for fowls.

TYPE B – strains fermenting xylose but failing to ferment mannite or arabinose. This type included 22 strains, 12 from buffaloes, 7 from cattle, 2 from horses and one from a donkey. All these were non-pathogenic for fowls.

TYPE C – strains fermenting mannite and xylose but not arabinose. This type included 8 strains, 6 from rabbits and 2 from pigs, all of which were also non-pathogenic for fowls.

It is pointed out that all strains are pathogenic for the rabbit and so this animal can form no guide as to the origin of a strain. Pigeons were very susceptible to Type A and succumbed in from 15 to 24 hours, but Types B and C only proved fatal in from 2 to 5 days.

Serological types (details of which are given) show that between the types there is no serological relationship and that within the Types A and B the strains are serologically identical. The author is inclined to the view that Type C is an intermediate type being more closely related to both A and B than A and B are to each other. Furthermore, whereas Type C strains are not all serologically related to each other, they can be classified into two immunologically distinct subdivisions, namely, Type C.I including the pig strains and Type C.II the rabbit strains.

II. This paper gives the experiences of the staff of the Ambulatory Clinic of the New York State Veterinary College. The author demonstrates the value of haemorrhagic septicaemia bacterin as a prophylactic agent, but points out that care must be exercised in its use in a herd in which the disease has already broken out. Vaccinated animals appear to be more susceptible for the first few days. The disease can be successfully controlled in small herds by means of serum. It is too expensive to use in large herds and, as previously stated, the use of bacterins involves some risk. The use of agressins or sera of equine origin is responsible for occasional cases of anaphylaxis.

III. This is an account of an outbreak of pasteurellosis in rabbits. The chief features were the absence of lesions in the rabbits, and the pathogenicity of the isolated organism for guinea pigs, mice and pigeons but not for fowls and rats. The outbreak was arrested by means of an autogenous vaccine.—G. O. DAVIES.

OCHI, Y., & ZAIZEN, K. (1936). **Studies on** *Corynebacterium pyogenes*. **I.**—*J. Jap. Soc. vet. Sci.* **15.** 30-57. 7 tables. [12 refs.] [In Japanese: abst. from English summary pp. 13-14 of Pt. 2].

In 29 out of 30 cases of pyogenic infection of the peritoneal surfaces of the stomach and diaphragm (mostly following traumatic gastritis) in calves, the authors isolated *C. pyogenes*. When investigating the natural distribution of this organism in normal cattle, they found it in 34 out of 100 normal specimens of mucous membrane of the mouth, 2 out of 20 samples of nasal mucus, 6 out of 11 samples of vaginal mucus and 3 out of 32 samples of urine. It was not isolated from 100 samples of mucus from the mouths of horses. All the strains, whether from abscesses or normal mucous membrane, were identical morphologically, culturally and biologically.

KAGAN, F. I., & MALJAVIN, A. G. (1934). Sravnitelnaja ocenka effektivnosti formolvakcin protiv paratifa teljat. [**The Value of Formolized Vaccines against Calf Paratyphoid**].—*Sovyet. Vet.* No. 10. pp. 7-12. 6 tables. [French summary: abst. from orig.]

The authors, who work in a Russian Central Control Laboratory, made a comparison of vaccines against calf paratyphoid obtained from four of the principal Russian veterinary research institutes. The results of their observations are set out in numerous tables. The mortality among 32,000 calves inoculated prophylactically was only 0·45 per cent. compared with a general natural mortality of over 40 per cent. Of 1,460 calves inoculated for curative purposes, 14·5 per cent. died.

The authors came to the following conclusions:–(1) formolized vaccines against paratyphoid in calves should be widely applied; (2) a formolized vaccine with 0·3 to 0·4 per cent. of formalin in agar, kept in an incubator for 48 to 72 hours, is best both for qualitative and quantitative results, and (3) guinea pigs and white mice may be used as controls.

DE BLIECK, L. (1935). Coryza Infectiosa Gallinarum. [**Fowl Coryza**].—*12th Int. vet. Congr. 1934.* **3.** 161-181. 6 figs. [14 refs.] [English, French and Spanish summaries: abst. from orig. in German].

The nature of infectious coryza is described [DE BLIECK (1931). *Tijdschr. Diergeneesk.* **58.** 310.]; it consists of a chronic type of nasal catarrh which can be transmitted by instillation of nasal secretion or by contact. A bacillus, thought to be the causal agent, is described in detail. The organism requires X and V factors for growth and so is placed in the *Haemophilus* genus. With this organism coryza could only be produced if applied in conjunction with nasal exudate, whereas it was not possible to produce the disease with other members of this genus or with other organisms known to cause respiratory disease in other animals. No filtrable infective agent could be identified. Immunity followed both natural or artificial attacks of disease, but the degree of immunity which resulted was proportional to the virulence of the original infection. Investigations on prophylactic vaccination should aim at attenuating the causal organism without destroying its antigenic capacity.—E. J. PULLINGER.

I. JOHNSON, E. P., & ANDERSON, G. W. (1936). **Pullorum Disease in Turkeys, with Some Reference to Fowl Typhoid in Turkeys.**—*J. Amer. vet. med. Ass.* **88.** 375-384. 1 table. [7 refs.]

II. —. (1936). **The Antigen Control Project of the National Poultry Improvement Plan. U. S. Bureau of Animal Industry.**—*Ibid.* 385-386.

III. VAN ROEKEL, H., & RETTGER, L. F. (1936). **Variation of Salmonella pullorum.**—*J. infect. Dis.* **58.** 172-184. 7 figs., 2 tables. [10 refs.]

I. The authors describe two outbreaks of *S. pullorum* infection of turkey poults; in one of these 115 out of 116 birds died and, in the other, 46 out of 140 died.

The onset of the disease, symptoms and lesions were similar to those found in chicks, except that white diarrhoea was rarely noticed and gross lung lesions were generally absent. One carrier female bird was found by the agglutination test in the breeding stock producing each group of poults, and all the evidence pointed to the transmission of the disease through the egg. These two birds reacted at a titre of 1 : 400 and *S. pullorum* was recovered from one of them but not from the other, although both showed typical lesions of the disease.

A Gram-positive non-pathogenic species of bacterium was isolated from poults bred from 14 females which reacted to the agglutination test at a titre of 1 : 25. Comparative agglutination tests of adult turkey sera made with antigens of this organism and *S. pullorum* showed that the reaction was almost consistently greater when this undetermined organism was used. The authors concluded that an agglutination titre of 1 : 50 is necessary as a positive reaction to *S. pullorum* infection in turkeys.

This paper was discussed at the Annual Meeting of the United States Live Stock Sanitary Association and reference was made to various bacterial diseases of turkeys liable to confuse the agglutination test for *S. pullorum* infection.

II. The co-ordinating committee supervising this plan has approved three forms of agglutination test for the detection of carriers of *S. pullorum* infection :– (1) the standard tube test; (2) the stained-antigen rapid whole-blood test, and (3) the rapid serum test. All antigens are subject to the approval of the U. S. Department of Agriculture. This department patented the stained-antigen and the co-ordinating committee has now had funds provided for the testing by the U. S. Bureau of Animal Industry of all samples of stained antigen manufactured by licensees under the patent.

III. The authors found 13 variants of *S. pullorum* in 163 freshly isolated strains. A marked feature of these variants was their salt sensitiveness, but this may be overlooked if the rapid serum agglutination test is used. The variation from normal was slight in some cases and included differences in morphology, type of colony and behaviour in broth.

The authors developed many sub-types from one parent strain. Repeated transfer, holding in meat infusion broth, or cultivation on meat extract agar and later sub-cultivation on liver infusion agar, were found to be the best methods for inducing variations. The stabilization of variants was done by means of colony selection and frequent transfer to solid media.

The terms " R " and " S " appear inappropriate because some " S " type variants were different from their parent strain in their antigenic structure.

Variants may settle out in broth cultures or in sodium chloride solution. In general they were less virulent or were avirulent.

Repeated subcutaneous inoculation of large doses into chicks and guinea pigs usually led either to a reversion to normal type with regained virulence or to results which probably indicated that the culture of the variant was not quite pure.

The agglutinogenic and absorptive power of the variants was usually less than normal. The authors suggest that strains of *S. pullorum* used for test purposes should be stable in type when repeatedly subcultivated and that they should be frequently tested for their agglutinating properties.—C. V. WATKINS.

I. —. (1936). **Report of Committee on Bang's Disease [U.S. Livestock Sanit. Ass.]**—*J. Amer. vet. med. Ass.* **88.** 273-275.

II. Goerttler. (1936). Die Staatliche Bekämpfung des seuchenhaften Verkalbens. [**The State Campaign against Bovine Contagious Abortion in Germany**].—*Dtsch. tierärztl. Wschr.* **44.** 291-295.

III. Kurtze, H. (1936). Ueber das Vorkommen von Abortus-Bangbakterien in den Harnorganen, insbesondere in der weissen Fleckniere, des Kalbes. [*Brucella abortus* **in Spotted Kidneys in Calves**].—*Z. Fleisch- u. Milchhyg.* **46.** 255-256. [8 refs.]

I. The importance of a uniform technique for the agglutination test is stressed. Recommendation is made for the continuance of efforts to develop a satisfactory allergic test. Attention is drawn to the danger of introducing pregnant animals into clean herds even though negative to the agglutination test.

II. Control of *Br. abortus* infection is based on the agglutination test. Vaccination with living organisms is now strictly prohibited in Prussia.

III. Cultural examination of 14 pairs of white-spotted kidneys failed to reveal the presence of *Br. abortus*. Of 300 calves which were slaughtered, 24 (8 per cent.) gave a positive reaction to the agglutination test, but *Br. abortus* was not found in the blood, urine, urinary lymph glands or spleen of the positive or the negative calves.—N. J. Scorgie.

I. Hofmann, P. (1936). Experimentelle Studien über die Immunität bei der Banginfektion. [**Immunity to** *Brucella abortus* **Infection**].—*Arch. wiss. prakt. Tierheilk.* **70.** 200-211. 2 tables. [Numerous refs.]

II. Götze, R., & Müller, J. (1936). Weitere Versuche zur chemotherapeutischen und unspezifischen Behandlung der Brucellose der Rinder. [**Chemotherapy and Non-Specific Treatment of Bovine Contagious Abortion**]. —*Dtsch. tierärztl. Wschr.* **44.** 275-280. 9 tables. [14 refs.]

III. Velu, H., & Zottner, G. (1936). L'infection de Br. abortus en excipient gras chez les bovins et les problèmes qu'elle pose. [*Br. abortus* **Fatty Base Vaccine**].—*Bull. Acad. vét. Fr.* **9.** 213-217. [11 refs.]

I. Living brucella culture, heat-killed culture, specific protein material, cell-free culture filtrate and a mixture of culture filtrate and specific protein were used in an attempt to produce immunity in rabbits, guinea pigs and mice. It is noteworthy that the specific protein was toxic in doses of 0·5 mg. per kg. body weight. All vaccines stimulated antibody production to a reasonably high titre, particularly after intravenous injection, the living vaccine being the most effective. No therapeutic or prophylactic value could, however, be attributed to these vaccines.

II. A number of chemical preparations were tested for their value in the control of bovine contagious abortion. None proved to be effective.

III. The inoculation of *Br. abortus* suspended in a fatty or oily base produced a mild systemic reaction in bovines, and a strong serologic reaction, but rarely abortion. The authors emphasize that infection is still propagated by such vaccine, and that the diagnostic value of serologic tests is eliminated if vaccination is carried out.—E. J. Pullinger.

Wilson, D. E. (1935). **The Human Incidence of Brucella Infections in a Cattle Bearing District of Tanganyika Territory as determined by Agglutination Tests.**—*E. Afr. med. J.* **12.** 108-110. [7 refs.]

270 blood samples taken from human subjects resident in a typical cattle district of the Territory were examined for brucella antibodies. Agglutinins, in titres varying from 1 : 25 to 1 : 1,000, were demonstrated in 11 samples. Recommendations for carrying out the agglutination test are noted.—E. J. Pullinger.

I. SCOTT, J. P., TURNER, A. W., & VAWTER, L. R. (1935). **Gas Edema Diseases.**—*12th Int. vet. Congr. 1934.* **2.** 168-187. 1 table. [Numerous refs.] [French, German and Spanish summaries].

II. MIHAILESCU, M. (1935). Le problème des oedèmes gazeux des bovidés. [**The Problem of Anaerobic Infections in Cattle (Review)**].—*Ibid.* 201-217. 1 table. [Numerous refs.] [English, German and Spanish summaries].

III. —. (1935). **Discussion of Gas Edema Diseases.**—*Ibid.* 217.

I. This paper does not lend itself to abstraction as it comprises a classification of gas oedema diseases with a short summary of the outstanding features of each disease. The following is the classification which also enumerates the diseases described :–

A. General diseases due to a specific organism :– (1) blackleg ; (2) bacillary haemoglobinuria, and (3) " black disease".

B. Diseases involving chiefly the alimentary tract :– (1) bacterial infections – (a) braxy, (b) grass sickness [if an anaerobic infection], (c) lamb dysentery, and (d) " struck ", and (2) bacterial toxaemias – (a) pulpy kidney disease, and (b) infectious entero-toxaemia.

C. Wound infections :– (1) malignant oedema, (2) bighead of rams, (3) Crow disease, (4) anaerobic infection in birds, and (5) Sordelli infection.

II. Whilst the majority of bacteriologists consider *Clostridium chauvoei* to be the chief if not the only anaerobe concerned in blackleg, the author is of the opinion that cases due to *Cl. septique*, *Cl. oedematiens*, and *Cl. welchii* (*B. perfringens*) are not less numerous than those caused by *Cl. chauvoei*. In only seven cases out of 42 did he find *Cl. chauvoei* and in three of these it was present along with other anaerobes.

Cl. oedematiens was found in seven cases, four times alone and three times with *Cl. welchii*. *Cl. welchii* occurred in 33 cases, in 21 of which it was alone. *Cl. septique* was apparently only found once and then in conjunction with *Cl. chauvoei*.

The author also points out the close relationship of *Cl. chauvoei* to *Cl. septique*. Whilst serologic experiments do not favour the identity of the organisms, neutralization experiments suggest that in the protoplasm of *Cl. septique* there is a characteristic nucleus for *Cl. chauvoei*. " *Cl. chauvoei* is derived from *Cl. septique*."

III. In the discussion Dr MARSH refers to the occurrence of " black disease " in Montana and points out that, in formolized vaccine preparation, *Cl. oedematiens* was difficult to kill by the usual concentrations of formaldehyde. In view of this the bacteria and culture liquid were treated separately and later mixed. Stronger formaldehyde was used for the bacteria than for the liquid.—GWILYM O. DAVIES.

UNDERWOOD, E. J., & SHIER, F. L. (1935). **Toxic Paralysis (Botulism) of Sheep in Western Australia.**—*J. Dep. Agric. W. Aust.* **12.** 277-284. 2 tables. [1 ref.]

Losses due to botulism in sheep have reached very serious proportions during the last few years, the source of the toxin being rabbit carcasses which are eaten by the sheep when the pasture becomes poor during the long dry summers [this *Bull.* **4.** 607 and **5.** 586]. The provision of phosphorus supplements, as recommended earlier, usually does not prevent the pica, which is a sarcophagia.

Feeding experiments were carried out to determine the effect of various food supplements on the pica and on the blood phosphorus levels. Sheep taking up to 7 g. of P_2O_5 daily in lick did not show different blood phosphorus values from control animals, so evidently the latter did not suffer from phosphorus deficiency. Supplementary feeding of linseed cake, wheat, meatmeal and chaff to a large extent

prevented the sarcophagia, but none was entirely effective in doing so. Some sheep, which were fed supplements and were not seen to exhibit any liking for rabbit carcasses, nevertheless died from botulism and it is thought that the drinking water was the source of the toxin. Further work is planned but at present rabbit control and pasture improvement offer the best preventive measures, as supplementary feeding may be economically unsound in most instances.—W. I. B. B.

GULBRANDSEN, L. F. (1935). **Invasion of the Body Tissue by Orally Ingested Bacteria and the Defensive Mechanism of the Gastro-Intestinal Tract.**—*Amer. J. Hyg.* **22.** 257-273. 1 fig., 4 tables. [Numerous refs.]

Skin and mucous membranes are heavily contaminated with micro-organisms, but these tissues, whilst healthy, are able to prevent invasion of the deeper tissues. The mechanism involved, however, is not well understood.

Healthy adult dogs were fed, after fasting or feeding on a special diet, with the diluted washings from 24-hour agar plate cultures of *Chromobact. prodigiosum* and suspensions of *Salmonella paratyphi* B. Some of these dogs were also kept in air of 100 per cent. humidity at 85° to 96°F. Cultures were prepared from kidney, liver, spleen, mesenteric lymph nodes and blood from lungs and stomach and intestinal veins taken at intervals ranging from 15 to 60 minutes after administration of the test organism, but in no case were the test organisms or organisms previously inhabiting the hosts recovered on agar plates. Broth, however, became turbid and hanging drop preparations and slides from these seedings were crowded with bacteria in various stages of disintegration. Attempts to isolate viable forms failed.

Experiments with rats gave similar results, but it was not possible to determine whether the bacteria observed were the test organisms or others already present in the body.

Guinea pig foetuses obtained by Caesarian section were fed with agar plate washings of *S. typhi*, *S. paratyphi* B, *Staphylococcus aureus* and *Corynebact. diphtheriae*. Specimens of liver, spleen and lungs were removed at intervals varying from 15 to 60 minutes and cultured at 37°C. for 24 hours on broth which became turbid. Examination showed bacteria in an advanced stage of disintegration, but attempts to grow the organisms on solid media failed except in two cases (*S. paratyphi*).

Sixty guinea pigs were used (20 as controls). Four died whilst being fed with the bacterial emulsion and were submitted to the same examination, but no evidence of bacterial absorption was found.

It was concluded that bacteria are absorbed continually from the intestinal tract, but that they undergo alterations due to its defensive mechanism.

The significance of these altered bacteria in body immunity and susceptibility to disease is under investigation.—H. E. BYWATER.

I. DMITRIEFF, S., & SOUTÉEFF, G. (1936). Sur les phénomènes de dissociation et de lyse observés dans les cultures de l'*Actinomyces bovis* Bostroem. Essais d'application des filtrats de cultures lysées au traitement de l'actinomycose. [**Dissociation and Lysis in Cultures of** *A. bovis*. **Trials with Filtrates of Lysed Cultures in the Treatment of Actinomycosis**].—*Ann. Inst. Pasteur.* **56.** 470-476. 3 figs. [2 refs.]

II. CONNAWAY, J. W., & UREN, J. W. (1935). **Actinomyces (Lump Jaw, Big Jaw, and Wooden Tongue) in Cattle.**—*Bull. Mo. agric. Exp. Sta.* No. 357. pp. 16. 9 figs.

I. During a study of 19 strains of *A. bovis* Bostroem, the authors have

observed lysis on agar plates and in broth cultures. The phenomenon was associated with a certain type of colony. When lysis occurred it was always followed by the growth of daughter colonies of two types. One type had the characters of the mother colony with a tendency to lysis whereas in the other type the lytic tendency was absent.

The authors also showed that filtrates from lysed cultures had antigenic properties and contained a specific principle which seemed to have some therapeutic value.

II. This is a dissertation on actinomycosis in which the old views of infection are perpetuated and no mention is made of actinobacillosis even under differential diagnosis. All recent work on this subject has been ignored.—GWILYM O. DAVIES.

PINOY, P. E. (1936). Mycoses de la rate chez les animaux. [**Mycosis of the Spleen in Animals**].—*Rev. Path. comp.* **36.** 367-369.

Mycosis of the spleen seems rare in animals. Spontaneous mycosis has been recorded in the rat, the pig and the calf. The rat is subject to sporotrichosis (*Sporotrichum Beurmanni*) and blastomycosis (*Monilia albicans*), the pig to actinomycosis, and a case of aspergillosis has been recorded in a calf. Lesions in the spleen are also found following experimental infection of the pigeon, guinea pig and rabbit with *Aspergillus fumigatus*. Direct inoculation into the spleen of the cat of a culture of *Madurella mycetomi* gives rise to a mycetoma.—G. O. DAVIES.

CONANT, N. F. (1935). Synonymie de *Microsporum canis*, Bodin 1902 et de *M. equinum* Nicolas et Lacomme 1906. [**Synonymy of** *Microsporum canis* **Bodin, 1902, and of** *M. equinum* **Nicolas and Lacomme, 1906**].—*Ann. Parasit. hum. comp.* **13.** 161-164. [11 refs.]

The author, having searched the literature to trace the origin of the various names which have been applied to ringworm parasites, has arrived at the following conclusions.

According to the law of priority *Microsporum canis* Bodin, 1902, is the correct name and the following are synonyms :– *Microsporum* of the cat Fox and Blazall, 1896, *Microsporum* of the dog Bodin and Almy, 1897, *M. audouini* var. *canis* Bodin, 1900, *M. lanosum* Sabouraud, 1907, and *M. felineum* Sabouraud, 1907.

Also the name *Microsporum equinum* Nicolas and Lacomme, 1906, is correct and the following are synonyms :– *Microsporum audouini* var. *equinum* Delacroix and Bodin, 1896, and *M. audouini* var. *equinum* Bodin, 1898.—GWILYM O. DAVIES.

BENHAM, Rhoda W. (1935). **The Terminology of the Cryptococci with a Note on Cryptococcus mollis.**—*Mycologia.* **27.** 496-502. 2 figs. [17 refs.]

In medical mycology many names which have become familiar by common usage are nomenclatorially incorrect and for this reason no serious attempts have been made to place the names on a strict priority basis. The author points out, however, that, with regard to the generic names *Cryptococcus*, *Torula*, *Torulopsis* and *Eutorula*, there should be little difficulty as some of them have no wide currency. The generic name *Cryptococcus* should take preference on the grounds of both priority and usage and the other names mentioned above should be regarded as synonyms.—GWILYM O. DAVIES.

DISEASES CAUSED BY PROTOZOAN PARASITES.

I. SELWYN-CLARKE, P. S. (1934). **Trypanosomiasis in the Gold Coast (with Special Reference to 1933-34).**—*Rep. med. sanit. Dep. Gold Cst., 1933-34.* pp. 100-107. 1 table, 1 map.

II. DUKE, H. L. (1936). **On the Power of** *Glossina morsitans* **and** *Glossina palpalis* **to Transmit the Trypanosomes of the** *brucei* **Group.**—*Ann. trop. med. Parasit.* **30.** 37-38. [2 refs.]

III. DUKE, H. L., & MELLANBY, K. (1936). **A Note on the Infectivity of** *Trypanosoma rhodesiense* **in the Crop of** *Glossina palpalis.*—*Ibid.* 39. [1 ref.]

IV. CORSON, J. F. (1936). **Antelopes as Reservoirs of** *Trypanosoma gambiense* **[Correspondence].**—*Trans. R. Soc. trop. Med. Hyg.* **29.** 690.

V. LAMBORN, W. A., & HOWAT, C. H. (1936). **A Possible Reservoir Host of Trypanosoma rhodesiense.**—*Brit. med. J.* June 6th. 1153-1155. 1 fig. [2 refs.]

I. The number of cases of human trypanosomiasis in the Gold Coast Colony has risen from 26 in 1924–1925 to 1,179 in 1933–1934. This may be due partly to increased efficiency in the detection of cases, and also partly to immigration of infected persons from neighbouring territories. It is believed that transmission is mainly by *G. palpalis*, but *G. tachinoides* may be implicated. Preventive measures have consisted in the maintenance of clearings 50 yards round villages, 50 to 100 yards round water-holes, and for at least a quarter of a mile on each side of ferries and road-river crossings. It has been ruled that large trees in clearings shall not be felled, and that cattle kraals shall be kept outside villages to avoid attracting flies.

II. The author records that in parallel experiments in which over 2,000 *G. morsitans* and *G. palpalis* were fed on monkeys infected with *Tryp. rhodesiense* and *Tryp. gambiense*, whilst 3·83 per cent. of the *G. morsitans* dying after the tenth day contained flagellates, only 2·45 per cent. of the *G. palpalis* were infected.

III. This note records that specimens of *Tryp. rhodesiense* retained in the crop of *G. palpalis* for ten to 13 days after the infective feed of mammalian blood had lost their infectivity for rats.

IV. The writer of this letter draws attention to the possibility that the work which has been done on the natural infection of antelopes with *Tryp. gambiense* has not conclusively proved that these animals can act as a reservoir for this species ; in view of the fact that no experiments on human beings were undertaken, the strain of trypanosomes isolated from the antelopes may have been *Tryp. brucei.*

V. Attention is drawn to two views :– that *Tryp. rhodesiense* is a distinct species of trypanosome, and that it is purely a strain of *Tryp. brucei* which has become acclimatized to man. It is pointed out that in either case the existence of a reservoir host must be postulated, and a case of infection is recorded in a native of Nyasaland who was found to be infected with trypanosomes which caused him no inconvenience though the organism was virulent to dogs and rats, and capable of cyclical transmission in *G. morsitans.* Attention is drawn to the records of the creation of centres of sleeping sickness by the movement of infected human beings through *G. morsitans* areas, and it is suggested that, when sleeping sickness arises *de novo*, investigations should include the search for infection amongst apparently healthy persons.—U. F. RICHARDSON.

BOUVIER, G. (1936). Le diagnostic microscopique des trypanosomiases bovines en brousse. [**Microscopic Diagnosis of Bovine Trypanosomiasis in the Field**].—*Bull. agric. Congo belge.* **27.** 65-69. 1 table. [5 refs.]

JONES, E. R. (1936). **The Use of Nitric Acid in the Serological Diagnosis of Cattle Trypanosomiasis.**—*Vet. Rec.* **48.** 602-605. 4 tables. [8 refs.]

In the first paper the author points out that fresh film examination has its difficulties, and he recommends thick film examinations for the detection of bovine trypanosomiasis. Films should be fixed in alcohol-ether, dehaemoglobinized with acetic acid and stained with Giemsa's stain which has been rendered alkaline to phenolpthalein. [The examination of fresh smears is more reliable and easier unless a morphological examination of the trypanosome is required].

The second article records an investigation into the value of serum reactions with 20 chemical substances to ascertain their value as diagnostic agents in bovine trypanosomiasis. The best results were obtained with nitric acid in dilutions of 1·8, 1·5 or 1·3 per cent., the tests being performed by adding one drop of serum to 1 c.c. of the reagent. This only gave six weakly positive readings in tests of 114 sera of cattle believed to be free from infection, whilst with other reagents non-specific reactions were common. Whilst cases of infection with *Tryp. congolense* and *Tryp. vivax* gave a large proportion of negative readings, positive readings were obtained with 75 per cent. of the sera infected with *Tryp. brucei*, *Tryp. rhodesiense* and *Tryp. gambiense*. The author believes that the partial specificity is due to the action of nitric acid on excess euglobulin, the precipitate being in the form of metaprotein and not euglobulin itself.—U. F. RICHARDSON.

RANDALL, R., & SCHWARTZ, S. C. (1936). **A Survey for the Incidence of Surra in the Philippine Islands.**—*Vet. Bull. U. S. Army.* **30.** 99-108. 3 tables. [14 refs.]

The authors undertook a survey of the Philippine Islands for the incidence of surra. The observations apparently cover the years 1932 to 1934. In all, 1,068 animals from 20 of the 48 provinces were examined. Of these, 3 horses, 60 mules, 50 cattle, 15 buffaloes and 1 goat proved to be infected. In the majority of cases the complement-fixation test was the method employed for diagnosis. Some instances of spontaneous recovery of cattle were reported.—C. DAVENPORT.

MAZZA. (1934). Investigaciones sobre la enfermedad de Chagas. II. Hallazgo del gato como portador natural del *Schizotrypanum cruzi* en la provincia de Jujuy. IV. Difusión de la infección natural por *Schizotrypanum cruzi* en perros de la provincia de Jujuy. [**Chagas' Disease. II. The Cat as a Natural Host of** *Tryp. cruzi* **in the Province of Jujuy. IV. Spread of** *Tryp. cruzi* **by Dogs in Jujuy**].—*Univ. Buenos Aires Mis. Estud. Patol. reg. Argentina Jujuy.* No. 17. pp. 12-16 and 23-28. 8 figs. [Nos. I and III of this series were on other aspects of the subject and are not dealt with here].

II. *Tryp. cruzi* in the cat, particularly in kittenhood, remains in the circulating blood, while in man it soon forsakes the circulation for the tissues. The author, in his early expeditions to the province of Jujuy (Argentina), met with naturally infected cats, but during a later visit he examined cats with negative results. CLARK and DUNN examined, with negative results, a kitten found in a house in Panama, where there was a human patient affected with Chagas' disease. A puppy in the same house was found to harbour the parasite. The leucocyte formula of an infected kitten is given, also that of its non-infected brother ; in the latter, although it was not found to be infected, there being no nests of parasites in any of the organs, there were traces of past infection. The examination of ten other kittens and five adult cats examined in the province gave negative results, though they inhabited houses where acute cases of Chagas' disease had occurred.

In spite of these negative results, the author recommends further investigation with regard to the part possibly played by the cat (so closely associated with children) in the spread of the disease.

IV. A considerable number of cases of natural infection of dogs with *Tryp. cruzi* having been reported, the author decided, in view of the fact that dogs are so closely associated with children, to examine the dogs in all houses which he visited in the El Carmen department of the Jujuy province.

A bitch with trypanosomes in her blood was found. Three of her pups together with a pup of unknown parentage, and two whose mother gave negative results, were killed for the purpose of obtaining data relating to the hereditary character of the disease. The result of the *post-mortem* examination on these six pups is given. The spleens of all these animals were considerably enlarged and also the cervical, axillary and inguinal glands. Finally the author draws attention to the considerable epidemiological importance of the fact that in a short time and in a circumscribed area a considerable number of pups were met with which were naturally infected with *Tryp. cruzi*. Results of microscopic examinations are to be given in a later paper.

NIHMI, D. (1936). **Studies on Blackhead. I. Morphology, Development and Pathogenicity of Causal Agent in Body of Host.**—*J. Jap. Soc. vet. Sci.* **15.** 58-119. 15 figs. on 5 plates, 1 table. [Numerous refs.] [In Japanese: abst. from English summary pp. 15-19 of Pt. 2].

Blackhead was first reported in Japan by the author. It is now the cause of considerable economic loss. In this paper the author gives observations on the natural occurrence, clinical symptoms and *post-mortem* appearances of the disease. He investigated its morphology, development and pathogenicity, and states his results, distinguishing the organism from the many other protozoa in the caecum of affected birds. Chickens and young turkeys were easily infected by intra-cloacal injection. The organism is not quite identical morphologically with *Histomonas meleagridis*.

GALLI-VALERIO, B. (1935). Les méningo-encéphalo-myélites dans les coccidioses. **[Meningo-Encephalomyelitis in Coccidiosis].**—*Schweiz. med. Wschr.* **65.** 213-214. [19 refs.] [In French].

The various forms of meningo-encephalitis in experimental animals have become important owing to the recent appearance of human meningo-encephalomyelitis following various infectious diseases and after vaccination against smallpox, and owing to the use of laboratory animals in research on the human disease. The author records the appearance of meningo-encephalomyelitis in rabbits, rats and squirrels infected with coccidia. He believes that the condition is caused by toxins liberated by the coccidia, and quotes certain evidence which suggests that these protozoa may be capable of producing a toxin.—U. F. RICHARDSON.

YAKIMOFF, W. L., BELAWINE, W. S., & NIKOLSKY, S. N. (1935). Zur Frage der Anaplasmose der Rinder in Russland (USSR). **[Anaplasmosis of Cattle in Russia].**—*Z. InfektKr. Haustiere.* **48.** 201-218. 2 tables. [Numerous refs.]

This article records observations made on anaplasma infection of cattle in Russia. Owing to the similarity of the symptoms, parasitic picture and blood changes, it is concluded that the disease is similar to that encountered in North Africa. The parasites proved transmissible to sheep by inoculation, but goats appeared to be resistant.

An interesting study of the effect of the disease on the leucocyte count showed that an early decrease occurred in the number of eosinophile cells, followed by a decrease in the percentage of basophile cells and young forms, whilst the percentage of polymorphonuclear forms remained fairly constant, and the number of lymphocytes and monocytes tended to increase. The number of erythrocytes can fall to 8–9 hundred thousand per c.mm. and one case is recorded in which the red cell count fell from the normal value of 7,520,000 to 2,736,000 after artificial infection.
—U. F. RICHARDSON.

RHINES, C. (1935). **The Relationship of Soil Protozoa to Tubercle Bacilli.**—*J. Bact.* **29.** 369-381. [3 refs.]

Colpoda steinii, a ciliate, was cultured for over a year in a nutrient broth suspension of avian tubercle bacilli. Stained preparations revealed the protozoan to have ingested many of the acid-fast bacilli. Sterile nutrient broth alone and filtrates of glycerin broth cultures of the avian bacillus failed to support the growth of the ciliate.—GWILYM O. DAVIES.

DONATIEN, A., & LESTOQUARD, F. (1936). Existence de la prémunition dans la rickettsiose naturelle ou expérimentale du chien. [**Immunity to Natural and Experimental Rickettsia Infection of the Dog**].—*Bull. Soc. Path. exot.* **29.** 378-383. [3 refs.]

The authors have already described the clinical symptoms of a disease of Algerian dogs induced by *Rickettsia canis*, which is transmitted under natural conditions by *Rhipicephalus sanguineus* [see this *Bull.* **6.** 225]. The tick is infective in all its stages of development and the virus passes to the next generation. Two strains have been successfully passaged through dogs.

Several immunity experiments were undertaken by the inoculation of recovered animals with large doses of virulent blood. Thus, two dogs which had survived an acute attack were completely refractory 23 and 38 days respectively after recovery. It was noted, however, that splenectomy of apparently recovered animals often caused the reappearance of *Rickettsia* in the circulation, in one instance after a lapse of five months. It is suggested, therefore, that immunity is dependent upon the persistence of small numbers of *Rickettsia* in the body.—R. E. GLOVER.

MCINTOSH, K. S. (1935). **Ulcerative Spirochaetosis of Pigs.**—*Qd agric. J.* **43.** 492-495. 3 figs.

Ulcerative spirochaetosis of pigs has been definitely diagnosed in Queensland, apparently for the first time.—W. I. B. BEVERIDGE.

DISEASES CAUSED BY VIRUSES.

WRÓBLEWSKI, W. (1936). Die Morphologie des Peripneumonie-erregers im Lungenexsudat kranker Tiere. [**Morphology of the Organism of Contagious Bovine Pleuro-Pneumonia in Lung Exudate**].—*Zlb. Bakt. I.* (*Orig.*). **136.** 172-177. 22 figs. on 1 plate. [12 refs.]

The bacteriology of the causal organism of contagious bovine pleuro-pneumonia has been studied. The organism is considered to be closely allied to the true fungi, since it forms mycelia, conidial filaments and conidia containing spores. The cultural characteristics on 8 per cent. horse serum agar and in fluid medium are described. The most characteristic feature is the formation of the so-called conidial rings, circular filaments having radial outgrowths which have a star-like

appearance. [The classification and nomenclature of this organism is still uncertain. For many years the generic name of *Asterococcus* was accepted, but more recently the names *Borellomyces* and *Asteromyces* have been adopted by some workers].
—E. J. PULLINGER.

I. CLAASSEN, P. (1936). Beiträge zur Differentialdiagnose der Maul- und Klauenseuche. [**Differential Diagnosis of Foot and Mouth Disease**].—*Dtsch. tierärztl. Wschr.* **44.** 259-262. [4 refs.]

II. SCHMIDT, W. (1936). Der Einfluss des Maul- und Klauenseuche-Virus und der Haltung auf das Entstehen von Euterveränderungen bei säugenden Meerschweinchen. [**Effect of the Virus of Foot and Mouth Disease on the Udder in Lactating Guinea Pigs**].—*Z. InfektKr. Haustiere.* **49.** 163-169. 2 figs. [12 refs.]

III. BARTELS, & CLAASSEN, P. (1936). Zur Frage der Erkrankung des Wildes an Maul- und Klauenseuche und ihre Bedeutung für die Verschleppung in Klauenviehbestände. [**Wild Game in the Epidemiology of Foot and Mouth Disease**].—*Berl. tierärztl. Wschr.* **52.** 230-233. [3 refs.]

I. A discussion of the difficulties which sometimes attend the clinical diagnosis of foot and mouth disease. Diagnosis may be particularly difficult when collateral evidence indicating the presence of infection in the district is not available. No new information is reported.

II. It has often been noted that foot and mouth disease virus is excreted in the milk of lactating guinea pigs affected with experimental infection, whilst inflammation of the gland may often be seen. Schmidt has shown that the inflammation is due, not to virus, but to secondary invasion with staphylococci associated with bad hygiene. Any febrile condition would predispose to such bacterial invasion.

III. A discussion of the part which wild animals may play in Germany in the spread of foot and mouth disease. Circumstantial evidence is advanced regarding the infection of wild animals with virus but no reliable experimental data are available to indicate to what extent wild animals might hinder control of this disease.—E. J. PULLINGER.

VAN SACEGHEM, R. (1936). L'entérocoque dans la peste bovine. [**The Enterococcus in Rinderpest**].—*Bull. agric. Congo belge.* **27.** 51-52. [2 refs.]

COLBACK, H. R. F., & CACCAVELLA, A. (1936). Sur la transmission de la peste bovine par les animaux séro-infectés. [**Transmission of Rinderpest by Animals Inoculated by the Serum-Virus Method**].—*Ibid.* 53-56.

CACCAVELLA, A. (1936). Essai d'une nouvelle vaccination contre la peste bovine avec du virus traité par le lysol. [**Vaccination against Rinderpest with a Lysol-Treated Virus**].—*Ibid.* 57-59.

—. (1936). La muqueuse des voies digestives en tant qu'antigène vaccinant dans la peste bovine. [**The Mucous Membrane of the Digestive Tract as Material for Use in Vaccination against Rinderpest**].—*Ibid.* 154.

The first article records an investigation as to the enterococcus associated with rinderpest encountered in the blood and bone-marrow of affected animals. The organism from culture was found to be avirulent to cattle, rabbits and guinea pigs, and a vaccine prepared from cultures gave no protection against rinderpest.

The second article records experiments to ascertain how long cattle inoculated by the serum-simultaneous method remain infective. Blood was drawn from two inoculated animals daily from the sixth day onwards and inoculated into susceptible

calves. The blood proved infective up to the 16th day after inoculation, but from the 17th day neither produced infection nor conferred immunity.

The third article records that when 10 per cent. lysol solution was added to blood containing the rinderpest virus to make a concentration of lysol of 4 : 1,000, and contact of 5, 20 and 30 minutes allowed before injecting into three susceptible cattle, the animals only gave a slight temperature reaction, but three months later proved to be immune. The lysol virus mixture was injected in doses of 7 c.c. to 10 c.c.

The fourth paper is a review of an article already abstracted [see this *Bull.* **5.** 809].—U. F. Richardson.

I. Oppermann, T. (1936). Schwierigkeiten bei der Diagnose der ansteckenden Blutarmut der Pferde. [**Diagnosis of Equine Infectious Anaemia**].—*Dtsch. tierärztl. Wschr.* **44.** 169-173. 3 figs., 2 tables, 1 chart. [6 refs.]

II. Mohler, W. M. (1935). **Observations on Complement-Fixation with Distilled Water-Spleen Antigen in Equine Infectious Anemia.**—*J. Amer. vet. med. Ass.* **88.** 624-627. [3 refs.]

III. Piérot, M. (1936). Quelques remarques sur la typho-anémie. Ses rapports avec l'anémie infectieuse. [**Connexion between " Typho-Anémie " and Equine Infectious Anaemia**].—*Rev. gén. Méd. vét.* **45.** 141-151. [1 ref.]

IV. Wilmes, H. (1936). Kann durch Verwendung des chirurgischen Nahtmaterials " Carnofil-Bost " die ansteckende Blutarmut der Pferde auf den Menschen übertragen werden ? [**Transmissibility of Equine Infectious Anaemia to Man by Suture Material made from Horse Tissue**].—*Berl. tierärztl. Wschr.* **52.** 249-251. [20 refs.]

V. Mench, K. (1936). Ueber ansteckende Blutarmut. [**Equine Infectious Anaemia**].—*Ibid.* 261-264.

VI. Balozet, L. (1936). Etudes expérimentales sur l'anémie infectieuse des équidés (III). Essais négatifs de prémunisation par l'emploi de la rate virulente, glycérinée ou phéniquée. [**Equine Infectious Anaemia. III. Failure in Premunition by Virulent, Glycerinated or Phenolized Spleen Vaccine**].—*Arch. Inst. Pasteur Tunis.* **25.** 272-283. 2 figs. [4 refs.] [For abst. of previous article of this series, see this *Bull.* **6.** 126].

I. The diagnosis and differential diagnosis of equine infectious anaemia are discussed with special reference to the difficulty of distinguishing it from non-specific anaemias. Reference is also made to the difficulty of distinguishing this disease in cases of mixed infection. No new information is noted.

II. Experiments are reported on the preparation of a suitable antigen for use in the complement-fixation test. Infected tissues were extracted with distilled water or saline and the resulting extract had reasonable antigenic value. Aqueous extraction was more effective than the action of other common solvents. Investigations are being continued.

III. 137 cases of anaemia amongst equines were studied as regards symptomatology and epidemiology. A general distinction was drawn between cases of simple anaemia and those complicated by secondary conditions such as nephritis, pneumonia, etc. [The main value of this extensive study has been lost because no laboratory confirmation of the cause of the anaemia was made, but it is probable that the majority of cases were affected with infectious anaemia – see also this *Bull.* **6.** 30. regarding the term " typho-anémie "].

IV. Equine infectious anaemia is not identical with human pernicious

anaemia. Evidence does not support any contention that the equine infection is transmissible to human beings.

V. A consideration of infectious anaemia from the point of view of state control. No new information is recorded and the article is unsuitable for abstraction.

VI. Infectious anaemia virus may be modified in virulence by the action of 50–90 per cent. glycerin or 0·1 per cent. phenol acting for several days at refrigeration temperatures of –5° to –15°C. Virus thus modified had no protective value when used as a vaccine.—E. J. PULLINGER.

I. CHLUSZOW, K. A., & RASTEGAJEWA, A. M. (1935). Charakteristik der Virusstämme der Encephalomyelitis (Borna'schen Krankheit) der Pferde. [**Characters of the Virus of Equine Encephalomyelitis**].—*Dtsch. tierärztl. Wschr.* **43.** 484-486. 1 table. [1 ref.]

II. ZEKI, S. (1934). Liquoruntersuchungen bei künstlich mit dem Virus der Bornaschen Krankheit infizierten Kaninchen unter besonderer Berücksichtigung des Befundes bei gesunden und spontan erkrankten Kaninchen. [**The Cerebrospinal Fluid in Borna Disease in the Rabbit.**]—*Inaug. Diss., Giessen.* pp. 52. 7 tables, 3 charts. [Numerous refs.] [Also appeared in *Z. InfektKr. Haustiere.* **48.** 230].

I. Three strains of Borna disease virus have been examined as regards their pathogenicity for laboratory animals. All three killed rabbits, guinea pigs and rats, inoculated intracerebrally. Following intramuscular or subcutaneous inoculation, differences of virulence of the virus strains could be demonstrated. Pigeons proved completely resistant to intracerebral inoculation. The minimal lethal dose of virus consisted of 0·2 c.c. of a 1 : 1,000 saline dilution of infected brain emulsion.

II. Rabbits artificially infected with the virus of Borna disease showed changes in their cerebrospinal fluid which are characteristic of this infection. The changes include an increase of the leucocyte count, particularly of lymphocytes and monocytes; bodies resembling "Glanz corpuscles" may also be seen. There is an increase both of globulin and total protein. Similar changes may be seen in cases of spontaneous encephalitis and in other natural diseases of rabbits. Consequently, though the changes always occur with Borna disease, they are of little significance for differential diagnosis.—E. J. PULLINGER.

PACHOMOV, V. I. (1936). K voprosu o stojkosti virusa epizooticeskego encefalomielita losadej. [**The Resistance of the Virus of Equine Encephalomyelitis to Various Physical and Chemical Agents**].—*Sovyet. Vet.* No. 1. pp. 27-28. [French summary: abst. from orig.]

Experiments carried out with finely ground brain material from infected rabbits are described.

In these tests the virus was killed after 4 hours' exposure to July sunlight, 6 to 7 days' desiccation, 6 days in a saturated solution of hydrochlorate of sodium, 3 hours in a 0·1 per cent. solution of corrosive sublimate, 4 hours in a 0·5 per cent. solution of pure caustic soda, 4 hours in a 0·5 per cent. solution of commercial caustic soda, 4 hours in a 5 per cent. solution of calcium chloride, and after 20 hours in Schattenfroh's pickling solution.

The virus survived 5 days' desiccation, 4 hours in a 3 per cent. solution of "lysol" and 17 hours in a 5 per cent. solution of creolin.

ESCALONA, J., & CAMARGO, F. (1936). **Bovine Encephalomyelitis in Mexico.**—*J. Amer. vet. med. Ass.* **88.** 81-83. 2 figs.

This is an abbreviated account of an enzootic encephalomyelitis of horses, mules, cattle and pigs in Mexico. The principal symptoms were excitability, blindness and finally posterior paraplegia. The disease lasted from one to eight days and was almost invariably fatal. Several strains of a virus were isolated by the subdural inoculation of rabbits, mice and cattle. The bovine virus differed from that of the horse in its inability to infect pigeons. Presumptive evidence that the infective agent was tick-transmitted was obtained by observing the immediate cessation of outbreaks as soon as tick eradication measures were adopted.

—R. E. Glover.

I. Hurst, E. W. (1934). **Studies on Pseudorabies (Infectious Bulbar Paralysis, Mad Itch). II. Routes of Infection in the Rabbit, with Remarks on the Relation of the Virus to Other Viruses affecting the Nervous System. III. The Disease in the Rhesus Monkey, Macaca mulatta.**—*J. exp. Med.* **59.** 729-749, and **63.** 449-463. 6 figs. on 2 plates, 11 tables. [Numerous refs.] [For abst. of previous article of this series see this *Bull.* **4.** 349].

II. Cruveilhier, L., Truche, C., & Viala, C. (1936). Note sur deux cas de maladie d'Aujeszky observés en France. **[Two Cases of Aujeszky's Disease Reported in France]**.—*Ann. Inst. Pasteur.* **56.** 395-400. [9 refs.]

I. Virus (Iowa strain), inoculated subcutaneously, intradermally or intramuscularly into various regions of the rabbit body, was found to reach and to multiply in the corresponding level of the spinal cord and to a less extent in the other areas, indicating that the virus had reached the central nervous system by ascending the nerve fibres supplying the site of inoculation. Traces of virus were also found in the blood of these cases. Conversely, virus inoculated intracerebrally was found to travel down through the central nervous system but did not reach the sciatic nerve.

Virus inoculated into the base of the ear set up the disease after a consistently shorter incubation period than did the same dose of virus inoculated into the dorsum of the foot. The incubation period was still longer if the nerve supply to the dorsum of the foot were removed prior to inoculation, indicating that the virus can be carried by the blood to form foci elsewhere and from these foci ascend to the central nervous system *via* the nerves.

In an experiment in which massive doses of Iowa virus were inoculated intravenously into 12 rabbits which were killed at varying intervals after inoculation, it was found that there was not a uniform distribution of virus in the central nervous system ; the interpretation given is that the inoculated virus forms foci in the viscera and that from these foci the virus reaches the central nervous system *via* the nerve fibres. Thus the distribution in the central nervous system will depend upon the primary distribution in the viscera.

The Iowa strain has been passaged a number of times and it is now found that small quantities of virus appear in the blood, thus bringing this strain closer to the Aujeszky strain which regularly invades the blood.

In the discussion the characters of pseudorabies virus are compared with those of the other neurotropic viruses.

The monkey *Macaca mulatta* is susceptible to intracerebral inoculation of both the Iowa and the Aujeszky strains. Six out of seven untreated monkeys (one batch) showed the presence of abundant antibodies to B virus in their blood. Nineteen other monkeys showed no immune bodies. Two out of three monkeys immune to B virus survived an intracerebral inoculation of Aujeszky virus.

In monkeys inoculated into the sciatic nerve and killed at varying intervals, it was found that virus was first most abundant in the lumbar cord and that later

it ascended progressively to the higher regions of the cord, medulla and cerebrum. In the later stages of the disease the virus was less abundant in or absent from the lumbar cord, but lesions indicating its previous activity in this region were found.

The most marked histological changes occurred in the cerebrum, especially the temporal lobe, where some areas showed marked destruction of nerve cells while others might show much less severe lesions. The cerebellum was usually intact. The changes in the brain stem and basal ganglia were generally not severe and were vascular and tissue changes rather than destruction of nerve cells.

There was no evidence that in the monkey pseudorabies virus attacks any cells other than the neuroectodermal ones, whereas in the rabbit other cells are attacked.

II. Two outbreaks of Aujeszky's disease in cattle are recorded, occurring in two provinces in France. In both outbreaks the chief symptoms were those of intense itch. Death ensued in from 36 hours to three days from the onset of symptoms. One outbreak was confirmed by reproducing the condition in guinea pigs by intracerebral and intramuscular inoculation of brain suspension. Brain material from these guinea pigs was infective for rabbits.

The second outbreak was not confirmed.—A. Brownlee.

Scott, T. F. McN., & Rivers, T. M. (1936). **Meningitis in Man caused by a Filterable Virus. I. Two Cases and the Method of Obtaining a Virus from their Spinal Fluids.**—*J. exp. Med.* **63.** 397-414. 3 tables, 1 chart. [10 refs.]

Rivers, T. M., & Scott, T. F. McN. (1936). **Meningitis in Man caused by a Filterable Virus. II. Identification of the Etiological Agent.**—*Ibid.* 415-432. 7 figs. on 2 plates, 5 tables. [10 refs.]

A virus was isolated from the spinal fluid of two human subjects affected with a lymphocytic meningitis by the intracerebral inoculation of mice. A series of experiments has shown that the virus is filtrable through Berkefeld W candles and has a size, as estimated by filtration through graded collodion membranes, of 100 to 150 $m\mu$. It was passaged with ease through mice, guinea pigs and monkeys, but rabbits were almost entirely refractory to infection.

The infective agent was compared with the St. Louis type of the lymphocytic choriomeningitis virus of Armstrong and Lillie [this *Bull.* **5.** 723.] and with a similar virus isolated by Traub. Cross-immunity experiments indicated that the three viruses were immunologically identical.—R. E. Glover.

Waldmann, O., & Köbe, K. (1935). Diagnose, Verbreitung und Verbreitungswege der Ferkelgrippe. [**The Diagnosis, Incidence and Epidemiology of Swine Influenza**].—*Berl. tierärztl. Wschr.* **51.** 481-485. 1 table. [16 refs.]

An account of further studies of swine influenza, but no new information is reported. The authors stress the importance of this disease, emphasizing the fact that in Europe its distribution is not confined to Germany; it has also been reported in France and Czechoslovakia. The condition frequently occurs as an enzootic broncho-pneumonia. Transmission only occurs by means of actively infected animals or by chronic carriers. [For recent abstracts on this subject, see this *Bull.* **4.** 573, and **5.** 15].—E. J. Pullinger.

Kairies, A. (1935). Influenzaerkrankungen bei Frettchen und Beschreibung eines Bacterium influenzae putoriorum multiforme. [**Influenza in Ferrets.** *Bact. influenzae putoriorum multiforme*].—*Z. Hyg. InfektKr.* **117.** 12-17. 1 table. [17 refs.]

A spontaneous disease of ferrets is described which was thought to resemble

influenza. An organism was isolated from the respiratory tract which it was considered fell into the genus *Haemophilus*. [It is not clear what attempt was made to eliminate the possibility of distemper. As regards the organism which was isolated, the essential accessory growth factors were not ascertained, consequently its classification must remain a matter of speculation].—E. J. PULLINGER.

HOYLE, L. (1935). **The Production of Pneumonia in Mice by Bacteria and Filterable Viruses.**—*J. Path. Bact.* **41.** 163-176. 8 figs. on 4 plates. [7 refs.]

Experiments were undertaken in mice with the object of inducing pulmonary lesions by the intranasal instillation of viruses and bacteria. The viruses of swine and human influenza respectively, in the unfiltered state, produced lesions comparable to those described by ANDREWES, LAIDLAW and SMITH, and by SHOPE [see this *Bull.* **5.** 137, and **6.** 240]. In addition, the swine influenza virus was transmitted serially by filtrates, but indefinite results were obtained with the human virus (Seitz E.K.5 pads were used). No evidence of natural transmission from infected to healthy mice was obtained; moreover, sera from convalescent animals failed to afford any appreciable protection.

Serial passage of various pathogenic organisms was readily achieved. In general, the lesions they produced were remarkably similar to those induced by swine influenza virus. Those found to be pathogenic by this route were *Haemophilus influenzae* (various types), *Bact. pneumoniae*, *Staphylococcus aureus* and certain bacteria from the respiratory tract of normal mice.

Attempts were made to isolate a virus from certain influenza-like outbreaks in man but, while a transmissible pneumonia was induced by unfiltered material from one case, filtrates were quite inert.—R. E. GLOVER.

I. KRASSOW, W. M. (1936). Anwendung der Präcipitationsreaktion zur Diagnostik der Virusschweinepest. [**The Precipitin Reaction in the Diagnosis of Swine Fever**].—*Arch. wiss. prakt. Tierheilk.* **70.** 237-242. 1 table. [1 ref.]

II. SEIFRIED, O. (1936). Neuere Forschungsergebnisse auf dem Gebiete der Histopathologie, Pathogenese und Diagnostik der Schweinepest. [**Recent Results of Research on the Histopathology, Pathogenesis and Diagnosis of Swine Fever**].—*Tierärztl. Rdsch.* **42.** 424-428 and 441-444. [Numerous refs.]

III. LE CHUITON, F., MISTRAL, C., & DUBREUIL, J. (1936). Transmission de la peste porcine au cobaye avec passage en série. Perte de virulence rapide pour le porc dès le premier passage du virus au cobaye. [**Serial Passage of Swine Fever Virus in Guinea Pigs with Resultant Rapid Loss of Virulence for Pigs**].—*C. R. Acad. Sci., Paris.* **202.** 96-98. 1 fig.

I. The precipitin test is useful for the diagnosis of swine fever, not only in the case of living animals, but also for the identification of infection in *post-mortem* specimens. As antigen in the test, the use of aqueous extracts of infected or suspected tissue is recommended. Such extracts are prepared by dialysing the tissue emulsion, the procedure yielding a clear fluid which contains specific antigen if the tissue was contaminated with virus. The detailed technique of dialysis is described.

II. A valuable review of the subject containing a useful bibliography, particularly of the German literature. Following a detailed survey of the histopathology of the disease and what little is known of the pathogenesis, the author discusses the significance of these changes from the diagnostic standpoint. He considers that such histopathological changes as have been described cannot be considered to be of specific diagnostic significance.

III. Swine fever virus was passaged through guinea pigs by intratesticular inoculations. Guinea pigs receiving virus suffered from a mild fever. After about 15 passages the virus was completely adapted to the guinea pig and modified in its virulence for swine, being almost non-pathogenic for the latter animals. [It is not recorded whether such modified virus retained its immunological properties].
—E. J. PULLINGER.

BALOZET, L. (1936). Contribution à l'étude expérimentale de la heart-water. [**Research on Heart-Water**].—*Arch. Inst. Pasteur Tunis.* **25.** 251-271. 20 figs. [1 ref.]

It has been shown that Tunisian sheep (Barbary type) are susceptible to heart-water infection. It has also been found that virus is highly concentrated in the central nervous system, whilst intracranial infection has proved to be a satisfactory route of experimental infection.

Virus was recovered from rats one to two weeks after intraperitoneal infection, though the animals showed no visible reaction. Guinea pigs, similarly treated, sometimes showed a febrile reaction whilst rabbits usually showed a noticeable fever, particularly with " passaged " virus. Fresh sheep virus was less effective in this respect.

Following inoculation with heart-water virus, rats and guinea pigs invariably gave negative Weil-Felix reactions [*i.e.* agglutination of *Proteus* (X19), a phenomenon diagnostic for the rickettsial infection of human typhus].

Virus was preserved in a virulent state for as long as 22 days by storing infected brain tissue at –15°C.—E. J. PULLINGER.

FINDLAY, G. M. (1936). **The Mechanism of Immunity in Rift Valley Fever.**—*Brit. J. exp. Path.* **17.** 89-104. 9 tables. [7 refs.]

It has been found that, in certain circumstances, neutral mixtures of Rift Valley fever virus and serum can be activated either by dilution or by altering the route of infection. By using a virus which was lethal for mice in a dose of 0·2 c.c. of a 1^{-9} to 1^{-10} dilution, it was found that when a fixed amount of immune serum was added to decreasing amounts of virus, a point was reached at which reactivation by dilution no longer occurred (virus dilutions 10^{-4} to 10^{-5} added to undiluted serum). Further experiments showed that reactivation by dilution and by altering the route of infection, *viz*, from intraperitoneal inoculation to intranasal instillation, occurred at the same point, suggesting that the two phenomena were fundamentally similar.

It was also noticed that certain mixtures, which were non-pathogenic when injected in large doses, became pathogenic when given by the same routes in smaller amounts. This is explained on the grounds that in the former case the virus invades the cells, multiplies and then meets the comparatively large amount of immune serum. Neutralization takes place and death does not occur. With smaller amounts, on the other hand, the amount of serum injected with the complex is insufficient to neutralize the virus after it has multiplied in the cells.

Mice which survived an injection of serum plus virus were immune only when the amount of virus in the mixture exceeded a certain minimum.—R. E. GLOVER.

I. HALLAUER, C. (1934-1935). I. Immunitätsstudien bei Hühnerpest. II. Mitteilung. Ueber das Schicksal von Hühnerpestvirus im immunisierten Tierkörper. [**I. Immunological Studies of Fowl Plague. II. Fate of Fowl Plague Virus in Immune Animals**].—*Z. Hyg. InfektKr.* **116.** 456-479 and **117.** 451-469. 12 tables. [Numerous refs.]

II. Oerskov, J., Schmidt, S., & Steenberg, Else. (1936). Caractères immunologiques de deux souches de virus de la peste aviaire à pouvoir pathogène différent vis-à-vis de la souris. [**Immunological Properties of Two Strains of Fowl Plague Virus with Different Virulence for Mice**].—*Rev. Immunol.* **2.** 254-259. 1 table. [3 refs.]

I. When grown in embryonal liver tissue culture, fowl plague virus rapidly loses its virulence for fowls whilst acquiring immunogenic properties. Virus prepared in this way produces a powerful active immunity within two weeks of inoculation, and this immunity lasts for some months. Birds seldom suffer any setback following the inoculation of such virus. On the contrary, the simultaneous inoculation of virulent virus and immune serum for the purpose of immunization is unsatisfactory owing to the danger of setting up and distributing active infection.

If virus is inoculated into actively immune birds it disappears from the body fluids within 30 minutes, the leucocytes are sterile after four hours, and the various tissues are sterile within 12 hours, with the exception of the liver and spleen, which are free from demonstrable virus after 48 hours. The destruction and removal of virus are effected by the same mechanism as that dealing with other foreign bodies.

II. Two strains of fowl plague virus were studied, one being of high and the other of low virulence for mice. Mice immunized with the strain of low virulence proved highly immune to subsequent inoculations of the virulent virus.

—E. J. Pullinger.

Bedson, S. P. (1936). **Observations Bearing on the Antigenic Composition of Psittacosis Virus.**—*Brit. J. exp. Path.* **17.** 109-121. 10 tables. [11 refs.]

A series of experiments has shown that psittacosis virus contains two antigens, one of which is heat-labile while the other is resistant to boiling. Both are capable of exciting the production of specific antibodies as revealed by complement-fixation tests.

The heat-stable antigen is partially linked to the elementary bodies and is partially free in the supernatant fluid after centrifugation. In the latter state, it is not carried down when the proteins of crude suspensions of the virus are coagulated by heat and is not removed by passage through a Seitz pad. This fraction fails to fix complement in the presence of antiserum, but induces slight precipitin reactions and an allergic dermal response in sensitized guinea pigs.

—R. E. Glover.

Meucci, C. (1934). Le ricerche eziologiche ed il reperto istoanotomico nella difterite aviaria (epiteliosis contagiosa mucosae avium). [**Histopathology of Fowl Pox**].—*Profilassi.* **7.** 248-252. 4 figs. [18 refs.] [English and French summaries : abst. from orig.]

The histopathological picture of the lesions found in the oral and laryngeal mucosa was of a degenerative, necrotic and haemorrhagic type, with absence or with traces only of fibrin.

The author refers to the "inclusion bodies" in the cytoplasm of some epithelial cells of the diseased mucosa, which are represented by one or two spherical or oval bodies of the size of the nucleus of the cell or slightly larger, structurally homogeneous, acidophilic in reaction and pink in colour when stained by Mann's and Giemsa's stains.—F. Veglia (Turin).

PARASITES IN RELATION TO DISEASE (GENERAL).

I. HALL, M. C. (1936). **The Eradication of Parasites vs. the Adjustment to Parasitism.**—*N. Amer. Vet.* **17.** No. 3. 17-19.

II. BHALERAO, G. D. (1936). **Worm Diseases of Poultry in India and their Control.**—*Agric. Live-Stk India.* **6.** 48-53.

III. METIVIER, H. V. M. (1936). **Some Worm Parasites of Stock in St. Lucia.** —*Trop. Agriculture, Trin.* **13.** 8. [1 ref.]

IV. SCHMID, F. (1936). Parasitenbekämpfung im Rahmen der Erzeugungschlacht. [**Control of Parasites of Farm Animals**].—*Dtsch. tierärztl. Wschr.* **44.** 81-84.

V. CAMERON, T. W. M. (1936). **Parasites of Importance in Meat Inspection in North America.**—*J. Amer. vet. med. Ass.* **88.** 282-288.

VI. —. (1936). **Report of Committee on Parasitic Diseases [U.S. Livestock Sanit. Ass.]**—*Ibid.* 421-431. 1 table.

I. Hall considers that all parasites are potentially harmful and should be destroyed wherever practicable. He considers that physiological control measures, making the best use of immunity and natural resistance to parasites, may serve as a useful makeshift for the present, but that eradication should be the ultimate objective; he sees a danger in the suggestion that our aim should be to produce healthy animals in equilibrium with their parasites.

II. Helminthiasis of poultry is wide-spread in India and does not receive the amount of attention which its importance requires. Bhalerao's paper gives a brief account of tapeworm infestation, caecum worm, roundworm and capillaria infestation, gapeworms and ocular filariasis. Symptoms, diagnosis, treatment and prevention are discussed.

III. Little is known of the parasites of domestic stock in the Lesser Antilles and nothing of the parasites in St. Lucia. The author collected the following species while on a recent visit to that island :- *Fasciola hepatica*, *Paramphistomum cotylophorum*, *Haemonchus contortus*, *Ostertagia circumcincta*, *Trichostrongylus instabilis*, *T. extenuatus*, *Oesophagostomum columbianum*, *Setaria labiato-papillosa* and *Metastrongylus elongatus*.

IV. The parasites which are so widely distributed in our farm animals cause very severe losses. We now have considerable knowledge of their life-histories, the prevention and treatment of diseases which they cause and the diagnosis of these diseases. More should be done, however, by way of passing this information on to the farmer by illustrated pamphlets and lectures illustrated by cinema films.

V. Cameron gives a brief account of the parasites of importance in meat inspection under the following headings :- " Parasites transmitted to Man only through Meat ", " Parasites rendering Meat unfit for Human Food ", and " Parasites of Importance in Differential Diagnosis ". Notes are given on the incidence of the various parasites and their relative importance in meat inspection and to public health.

VI. An attempt was made to survey the situation with regard to parasitic disease in the United States of America by means of a questionnaire addressed to the Agricultural Experiment Stations. The questions referred to the most troublesome parasitic diseases, the relative importance of parasites as compared with bacterial and virus diseases, the number of parasitologists employed in the study and control of animal parasites in each state, the types of parasitism which have received special attention and the relative success of any control measures tried

and, finally, to the measures which the U.S. Livestock Sanitary Association should adopt in the matter of assisting in the control of parasites.

Replies to all six questions are given in the report. In the opinion of 11 State Agricultural Stations, parasites were causing more loss than other diseases, 12 considered parasites to be less important, and the remainder either expressed no opinion or thought the relative importance to be about equal.

Some notes are also given on the parasites of wild life; the finding of *Dirofilaria* sp. in the heart of a muskrat and a serious infestation of wild ducks with *Eustrongylides mergorum* are mentioned.—E. L. TAYLOR.

PARASITES IN RELATION TO DISEASE (ARTHROPODS).

KINGSTON, J. S. (1936). **Spinose Ear Tick in India.**—*J. R. Army vet. Cps.* **7.** 142-143.

The author describes a case of cerebral derangement in an Australian horse in India. *Post-mortem* examination revealed the presence of ten mature ticks in the internal acoustic meatus of both ears. Their presence had resulted in perforation of the tympanum and necrosis of the auricular nerves adjacent to the semicircular canals of the left petrous temporal bone. The ticks were identified as *Ornithodorus megnini*. This is believed to be the first record of their appearance in the eastern hemisphere.—C. DAVENPORT.

HINDMARSH, W. L., & PURSELL, R. T. (1935). **Tick Paralysis of Dogs. Mortality after Serum Treatment.**—*Aust. vet. J.* **11.** 229-234. 1 table. [5 refs.]

The authors describe four cases of mortality due to *Ixodes holocyclus*, following injection with protective serum. The dogs appeared to be recovering following the injections, but suddenly relapsed and died. At *post-mortem* examination there were marked lung changes in the form of oedema, the collection of fluid in the bronchioles, etc. In addition, in contradistinction to the findings of previous workers, there were marked gastritis and enteritis. Three possible causes of death are suggested :- insufflation of vomitus, existence of more than one toxin, and serum sickness or anaphylaxis. Two different manifestations of the disease are recorded, motor paralysis without vomition, and vomition and loss of voice without evidence of paralysis of the limbs. Previous work on tick paralysis is briefly reviewed.—H. McL. GORDON.

FERRIS, G. F. (1933-1935). **Contributions toward a Monograph of the Sucking Lice. Parts VI-VIII.**—*Stanford Univ. Publ. biol. Sci.* **2.** 415-634. 87 figs. [Numerous refs.]

The first four of the preceding parts of this series were published from 1920 to 1923, and comprised generic and specific descriptions of sucking lice, obtained principally from the skins of mammals in American museums. The work was then supplemented by study of British and continental collections and, in 1932, part 5 appeared; this dealt mainly with the genus *Linognathus*, and contained further notes on the genera already considered.

Part 6 deals with the genus *Haematopinus*, part 7 mainly with *Pedicinus* [a genus found only on certain Old World monkeys], and part 8, which completes the series, mainly with the genera *Pediculus* and *Phthirus*. The papers are entirely descriptive, and do not lend themselves to abstracting.

The completed monograph forms a valuable work of reference on the Anoplura (sucking lice), of which practically all the described species have been examined.

Over 200 species altogether are recognized, of which some 90 have been first described by the author. Full synonymical lists for the valid species are given, and the descriptions are well illustrated by camera lucida sketches.—J. MacLeod.

Ratcliffe, F. N. (1935). **Observations on the Sheep Blowfly (*Lucilia sericata* Meig.) in Scotland.**—*Ann. appl. Biol.* **22.** 742-753. 2 figs., 1 table. [3 refs.]

This is an account of some experiments having as their object the elucidation of certain features of the life-history of *L. sericata*, the sheep blowfly. The majority of the observations recorded were made in the laboratory under somewhat unnatural conditions, the actual breeding experiments being carried out in a large cage. The investigations cover an enquiry into the number of eggs laid per female and the duration of the larval, prepupal and pupal stages. There is a record of some field observations made in 1933 and 1934 regarding the number of ewes and lambs affected month by month in a series of fields affording different kinds of shade and shelter. The influence of meteorological factors is also dealt with. A brief note on the temperature tolerance shown by *Calliphora erythrocephala* as compared with *L. sericata* is included.—C. Davenport.

I. Bishopp, F. C. (1934). **Screw-Worm Control in the Southeastern States.**—*U. S. Dep. Agric. Bur. Ent. Circ.* No. E-323. pp. 4.

II. —. (1935). **Screw Worm Control.**—*U. S. Dep. Agric. Bur. Ent. Circ.* No. E-342. pp. 2.

III. Dove, W. E. (1935). **Screw Worm Control.**—*U. S. Dep. Agric. Bur. Ent. Circ.* No. E-356. pp. 6. 1 fig. on 1 plate, 1 plan.

IV. Laake, E. W., Cushing, E. C., & Parish, H. E. (1936). **Biology of the Primary Screw Worm Fly, Cochliomyia americana, and a Comparison of its Stages with those of C. macellaria.**—*Tech. Bull. U. S. Dep. Agric.* No. 500. pp. 24. 14 text figs., 1 fig. on 1 plate, 8 tables. [1 ref.]

I. The biology of the screw-worm flies, the history of their increase in the southern states in recent years, and the nature and causes of myiasis are briefly reviewed. Preventive measures consist in the avoidance of surgical wounds, control of tick infestation, destruction of carcasses and prompt treatment of cases by benzol (commercial, 90 per cent.) and pine tar oil [see this *Bull.* **6.** 597 and 717].

II. This contains the same information as I, in the form of recommendations to farmers in Georgia.

III. A popular article briefly describing the life-history and type of attack, and recommending the use of benzol and pine tar oil for treatment.

IV. The recent discovery that a new species of screw-worm fly (*Cochliomyia americana* C. and P.), hitherto confused with *C. macellaria*, frequently provokes myiasis in animals, compelled a fresh study of the biology of the two species. Apparently *C. americana* under natural conditions breeds only in live animals, and is much less common than the other species, but it is responsible for initial infestation of wounds in the majority of cases in the tropics and subtropics of America. Although usually confined to open wounds, infestation of the unbroken lachrymal fossae of sheep has been observed. In the southern states the fly is active in late spring and summer, until the first appearance of frosts. It can survive mild winters, both as prepupae and pupae, and as adults.

The life-cycle takes longer than that of *C. macellaria*. Under natural conditions the eggs, laid in batches of up to 400, take from one to two days to hatch, and the larvae remain in the wound from three and a half to ten days. The lengths of the prepupal and pupal periods vary with climatic conditions.

Differential characters are given for the eggs, larvae and adults of the two species.—J. MacLeod.

PARASITES IN RELATION TO DISEASE (HELMINTHS).

Freund, L. (1933-1934). Helminthenwanderungen. I. Teil. Die Wanderungen und die "Passagen" der Nematoden im Wirtskörper. II. Teil. Die Wanderungen der Trematoden im Wirtskörper und vom Wirt zum Wirt. III. Teil. Die Wanderungen der Cestoden von Wirt zu Wirt und im Wirtskörper. [**The Migration of Helminths. Nematode, Trematode and Cestode Migration within the Host and from Host to Host**].—*Z. Parasitenk.* **6.** 243-268 and 592-602. 4 figs., 1 plate. [Numerous refs.]

Freund groups the nematodes, according to their methods of migration, into those which are carried in lymph and the blood system, those which pass from the veins to arteries, without entering the lymph glands, and those which migrate no further than the wall of the intestine. He regards the entry into the blood stream as a physiological necessity which is absolutely essential to the development of all primitive nematodes. Eventually, in response to some organotropism, the larvae leave the blood stream and grow to maturity in a position whence their eggs will reach the exterior.

Trematode life-histories are considered in a similar way, comparisons being drawn between the various ways in which the first and second intermediate host and the definitive host become infected, through mouth and intestine, by penetration of skin by miracidia, rediae or cercariae or by free metacercariae or cercariae being taken in by the mouth. The passage from one host to another is considered, as well as the migration within the host, through the blood stream from the intestinal wall or from the skin, and through the peritoneal cavity. Knowledge of the life-histories of trematodes, however, is not considered to be sufficient to permit of any systematic grouping of the different kinds of migrations.

The third paper gives a general account of the invasion of intermediate and definitive hosts by cestodes, and of the final transportation of the hexacanth embryo and the larva to their particular sites of development in the host's body. Many common examples are mentioned in the course of the paper and it is pointed out that penetration of the intestinal wall and transportation in the blood system is the usual route of helminth migration in the vertebrate host. [Freund appears to think that the direct development of the Anoplocephalids, without the requirement for any intermediate host, has been established. This is not so].—E. L. Taylor.

Mikačić, D. (1936). Prilog poznavanju parazita debelog crijeva konja. [**Parasites of the Large Intestine of the Horse**].—*Vet. Arhiv.* **6.** 347-361. [5 refs.] [Abst. from German summary].

The author found the following helminth parasites in the large intestines of horses in Yugoslavia :- *Triodontophorus minor* (Looss, 1900), *Oesophagodontus robustus* (Giles, 1892), *Trichonema barbatum* Smit and Notosoediro, 1923, *T. radiatum* (Looss, 1900), *T. bidentatum* (Ihle, 1925), *T. asymetricum* (Theiler, 1923), and *Probstmayria vivipara* (Probstmayr, 1865) Ransom, 1907. Male specimens of *Poteriostomum imparidentatum* Quiel, 1919 and *P. rátzii* (Kotlán, 1919) and a female specimen of *T. euproctus* (Boulenger, 1917) were also found.

The author found teeth in the oesophageal funnel of several species of *Trichonema* and considers that the tendency to grow these teeth serves in the identification of the species.

I. STOLL, N. R. (1936). **Certain Net Effects in Helminthic Parasitism, with Special Reference to the Sheep Host.**—*Cornell Vet.* **26.** 171-179.

II. GIOVANNOLA, A. (1936). **Energy and Food Reserves in the Development of Nematodes.**—*J. Parasit.* **22.** 207-218. 8 figs., 1 graph. [15 refs.]

I. In this address Stoll discusses certain aspects of the relationship between *Haemonchus contortus* and the sheep host with reference to the development of disease. An account is given of his previous work on the development of immunity to *H. contortus* and of the influence of the rate of pick-up of worms, nutrition and genetic constitution upon the occurrence of disease. He considers that the development of resistant strains of sheep by a process of selection is a line of investigation which promises to give valuable results.

II. Giovannola has made a study of the relative amounts of glycogen and of fat in nematodes in their various larval stages and in the adult stage. Glycogen was found to be most plentiful in adults and particularly in the germinal elements. It was also present in fair amounts in rhabditiform stages of the larvae, but only in very small amounts in filariform larvae. Fat, on the other hand, was present in large amounts in filariform larvae and in the adults, but only in small amounts in rhabditiform larvae and in migrating parasitic third-stage larvae.

It was concluded that glycogen is a reserve of energy and fat a reserve of food, as glycogen is found plentifully in all stages preceding rapid development, and fat preceding periods of scarce nutrition.—E. L. TAYLOR.

DEBELIĆ, S. (1936). Distomatoza i iskorisćivanje mesa. [**Losses caused by Liver Flukes**].—*Vet. Arhiv.* **6.** 317-321. [3 refs.] [Abst. from German summary].

Distoma infestation was found in 89 per cent. of 10,000 head of cattle over two years old. Losses through cutting away portions of condemned livers amounted to 3·21 kg. per liver. The loss of meat from each carcass, due to fluke infestation, was on an average 5·3 kg.

GAUGUSCH, Z. (1936). Badania nad wlasnosciami antygennemi wagra nierogacizny. [**Antigenic Properties of Porcine Cysticerci**].—*Przegl. wet.* **49.** 163-167. 3 tables. [3 refs.] [German summary: abst. from orig.]

The author describes the preparation of antigens from the scolices, cyst walls and bladder-fluid of porcine cysticerci, and his method of obtaining antisera. He considers that the scolex antigen is the best.

ROSS, I. C. (1936). **A Note on the Development of** *Echinococcus granulosus*.—*J. Coun. sci. industr. Res. Aust.* **9.** 67-68. [1 ref.]

A dog was artificially infected with *E. granulosus*, and faecal examination showed that the first eggs were passed on the 47th day after infection, this being one day earlier than had previously been noted. The efficiency of "nemural" was tested on this heavily infected dog. A full dose caused some 20,000 *E. granulosus* to be passed and, later, faecal examination showed no eggs but, when the dog was examined *post mortem*, four days after treatment, 3,100 viable scolices were found in the bowel.—W. I. B. BEVERIDGE.

I. FOSTER, A. O. (1935). **The Immunity of Dogs to Ancylostoma caninum.**—*Amer. J. Hyg.* **22.** 65-105. 7 tables, 7 graphs. [11 refs.]

II. OHIRA, T. (1935). **On the Active Immunisation of Animals against Tape Worms.**—*Trans. Far-East. Ass. trop. Med. 1934.* **1.** 601-604. 8 tables.

III. TURNER, E. L., BERBERIAN, D. A., & DENNIS, E. W. (1936). **The Production**

of Artificial Immunity in Dogs against *Echinococcus granulosus*.—*J. Parasit.* **22.** 14-28. 4 tables. [Numerous refs.]

I. Thirty dogs from eight litters were used in the series of seven experiments reported in this paper, 23 being subjected to repeated infection with *A. caninum*, and seven kept as controls for later test infections. Twelve of the experimental dogs died of hookworm infection during the course of the observation; of the 11 which survived, five were found to resist the test dose better than the controls, but the other six were not more resistant than the unimmunized controls. Freeing of the test animals from their worms did not interfere with the development of immunity. The six dogs which failed to develop immunity had directly descended from a dog which had failed to show resistance in previous experiments. The author considers that age resistance is of more importance than acquired resistance and, after summarizing his present views on immunity to *A. caninum*, he concludes that animals which become weak, anaemic or poor in health from any cause are rendered less resistant than normal healthy animals. He considers that animals with the advantage of age, or perhaps because of the advantage of a compensation which may have been induced by previous exposure to moderate worm infestations, may become able to resist more effectively the establishment of these worms, as well as their injurious effects. The genetical constitution of the host is, however, a factor which appears to complicate the resistance problem.

II. Kittens were immunized by repeated injections of antigens prepared from contents of *Cysticercus fasciolaris*, and their resistance was then compared with that of control kittens by the feeding of viable cysticerci and by measuring and weighing the worms which developed. The feeding of antigen was also tried and a combination of feeding and injection. A similar experiment was carried out with *Diphyllobothrium mansoni* infection in puppies which were immunized by injection of an emulsion of the cysts. Results obtained indicate the stimulation of a certain amount of resistance by these methods, particularly by the feeding of antigen, and the combination of feeding with injection.

III. Following their preliminary investigations published in 1933 [see this *Bull.* **4.** 363.] these authors have carried out investigations on a much larger scale, entailing observations on 79 adult dogs and 26 puppies. Echinococcus infection is present in some 25 per cent. of adult dogs in Syria (where this work was carried out) and, in spite of careful faecal examination before selecting dogs for the experiment, the authors could not prove that the dogs were free from infection, so that results are not so clear-cut as they otherwise might have been. The puppies, however, were specially bred for the work and were free from infection.

The following four types of antigen were used:—(1) prepared from viable scolices; (2) prepared from scolices and membrane of fertile cysts; (3) prepared from sterile cyst membrane, and (4) prepared from scolices, the method differing slightly from (1).

The results showed that a partial protection resulted from the injection of these antigens, all of which appeared to be equally effective, the greater protective action being observed where the largest number of injections had been given. A marked variation was observed in the responses shown by individual experimental dogs and the susceptibility of individual controls.—E. L. Taylor.

Lucker, J. T. (1936). **Extent of Vertical Migration of Horse Strongyle Larvae in Soils of Different Types.**—*J. agric. Res.* **52.** 353-361. 2 tables. [9 refs.]

This paper records a series of experiments devised to elucidate the problem of the extent to which strongyle larvae are capable of upward migration after being ploughed under in soil. Various types of soil were employed in the experi-

ments. Strongyle larvae were buried to varying depths in samples of each and observations were made for their appearance at the surface.

The results indicate that deep ploughing-under of infested soil should be of some value in the control of strongyle parasitism in horses. The efficiency of the method, however, varies with the type of soil and the depth to which the larvae are buried by the ploughing, clay soil presenting an almost complete barrier to vertical movement.—C. DAVENPORT.

I. CORNILS, W. (1935). Systematische Untersuchungen über Strongylideneier und Strongyliden im Kot und Darminhalt des Pferdes. [**Strongyle Infestation and Distribution of Eggs in the Faeces**].—*Inaug. Diss., Berlin.* pp. 44. 25 tables, 12 graphs. [Numerous refs.]

II. WENIGER, H. (1935). Versuche zur Verbesserung der Methoden zum morphologischen Studium bescheideter Larvenstadien der Pferdestrongyliden. [**Improvement of Methods for Morphological Study of Development of Larvae of Horse Strongyles**].—*Inaug. Diss., Berlin.* pp. 42. [Numerous refs.]

III. LUCKER, J. T. (1936). **Comparative Morphology and Development of Infective Larvae of Some Horse Strongyles.**—*Proc. helminth. Soc. Wash.* **3.** 22-25. 1 fig., 2 tables. [4 refs.]

IV. SCHOENAERS, F. (1936). La strongylose chez le cheval. [**Strongylosis of Horses**].—*Ann. Méd. vét.* **81.** 1-20.

I. Cornils gives a comprehensive review of the literature dealing with what is known of the life-history of the horse strongyles, followed by an account of his own studies on the appearance of the eggs in the faeces. He observed a great variation in the numbers passed during the morning, at midday and in the evening; no rule could be formulated, however. The eggs were observed to be present in greater concentration in the surface layer than towards the centre of the faecal balls. An attempt was made to differentiate some of the species of *Trichonema* by the eggs but the variation within any species was found to be too great; in general his measurements were smaller than those of other authors. The daily variation in egg output is thought to be sufficient to mislead investigators who use egg-counting methods for the testing of anthelmintics.

II. A study was made by Weniger of various methods of fixing and staining the larvae of the *Strongylus* worms of the horse. As fixative 96 per cent. alcohol caused the larvae to shrink, but 70 per cent. alcohol with 2 per cent. glycerin was found to be without this disadvantage. Formalin in strengths of 4, 5 or 10 per cent. proved to be quite good. Osmic acid vapour failed to kill the larvae and mercuric chloride was found to be very useful but, in spite of subsequent washing in iodine solution, led to the formation of numerous granules.

A preliminary softening of the chitin in " diaphenol " solution [stated to be chlordioxide and acetic acid] greatly facilitated the subsequent staining, so that haematoxylin would act quite satisfactorily within two and a half to three hours, instead of requiring 24 hours or as much as a week.

Methylene blue, nile blue sulphate, " sudan III " and osmic acid were only found to be of value for general morphology. Haematoxylin, giemsa and azur-eosin proved to be very useful for differentiating the nuclei of cells and picking out cell masses; and hydrochloric acid carmine, acid fuchsin and haematoxylin-eosin enabled the outlines of many of the cells to be differentiated so that some of the internal structures could be clearly outlined. Canada balsam was found to be the best mounting medium for stained specimens, but distorted the larvae.

III. Lucker gives an account of the morphology of the third-stage larvae of

Gyalocephalus capitatus, *Cylicocercus goldi* and *C. catinatus*, which he reared in pure culture from eggs obtained from female worms. The general structure closely resembles that of the third-stage larvae of the three species of *Strongylus*; the chief difference lies in the number of cells in the intestine; those of the *Strongylus* larvae have 18, those of *G. capitatus* 12, and those of the two species of *Cylicocercus* 8.

IV. This paper gives a general account of strongylosis, briefly describing the morphology of each of the three species, what is known of their life-history and pathogenicity, and the symtomatology and pathological anatomy of strongylosis. A rough floatation method is recommended as an aid to diagnosis and a rough estimation of the number of eggs per slide for the sake of comparison [counting of the eggs is not mentioned]. Several well-known treatments are described.

—E. L. TAYLOR.

I. LAPAGE, G. (1935). **The Second Ecdysis of the Infective Larvae of Certain Trichostrongylidae in Solutions of Sodium Sulphide and of Organic Compounds containing Sulphur.**—*J. Helminth.* **13.** 103-114. [6 refs.]

II. LAPAGE, G. (1935). **The Behaviour of Sterilized Exsheathed Infective Trichostrongylid Larvae in Sterile Media Resembling their Environment in Ovine Hosts.**—*Ibid.* 115-128. [24 refs.]

I. The effects of various substances in solution on the excystation of infective trichostrongylid larvae were observed in hanging-drop preparations under the microscope, and the following observations were made.

In infusions of chopped garlic bulbs the sheaths are cast off and dissolved. In 1 per cent. sodium sulphide the sheaths are cast off after being greatly distended and thinned. In 1 per cent. cystein hydrochloride, 1 per cent. sodium taurocholate or 1 per cent. saccharin, a cap becomes detached from the end of the sheath and the larva escapes, the sheath not becoming dissolved. In 0·2 per cent. sulphonal some excystations occurred, as also in 1 per cent. sodium thiosulphate, but the larvae usually died. None of the solutions were found to be so useful for experimental purposes as 5 per cent. " milton " hypochlorite.

II. In the course of this investigation over 1,500 infective larvae, artificially exsheathed and sterilized in 5 per cent. " milton " hypochlorite solution, were placed in more than 200 different sterile culture media, usually in hanging drops, in an endeavour to encourage development to a further stage. None of the larvae showed any growth, most formed a sheath and appeared ready for the next ecdysis; only ten actually performed this, but they died immediately afterwards. The " milton " solution had no effect in inducing the third ecdysis. The exsheathed third-stage larvae lived up to 41 days in the culture media but none showed any particular reaction to blood, mucosa of stomach or duodenum, or to digestive ferments which they might encounter in their normal habitat.—E. L. TAYLOR.

I. VAN CLEAVE, H. J. (1936). **The Recognition of a New Order in the Acanthocephala.**—*J. Parasit.* **22.** 202-206.

II. WHITLOCK, J. H., & MORRILL, C. C. (1936). **An Acanthocephalid Parasitic in a Calf.**—*J. Amer. vet. med. Ass.* **88.** 764-766. 1 fig.

I. van Cleave reviews the several attempts which have been made to arrange the Acanthocephala into natural orders and finally amends Meyer's classification (1913) by the erection of a new order, which he names Eoacanthocephala. This is characterized by the presence of syncytial cement glands in the male and of a single muscular wall in the proboscis receptacle.

II. The finding of an acanthocephalid, probably *Macracanthorhynchus*

hirudinaceus, in the jejunum of a calf is reported. This is the first report of an observation of a natural infection of this parasite of the pig in cattle.—E. L. TAYLOR.

I. STUBBS, E. L., & LIVE, I. (1936). **Methods of Diagnosing Filariasis in Dogs.**—*Vet. Ext. Quart. Univ. Pa.* **36.** No. 61. 11-15. [3 refs.]

II. STUBBS, E. L., & LIVE, I. (1935). **The Diagnosis of Filariasis in the Dog.**—*J. Amer. vet. med. Ass.* **87.** 680-682.

III. VAILLS, L. (1936). Filariose et microfilariose autochtones chez le chien. [**Filariasis and Microfilariasis in the Dog**].—*Rev. vét., Toulouse.* **88.** 133-141. [Numerous refs.]

IV. HINMAN, E. H. (1936). **Attempted Reversal of Filarial Periodicity in Dirofilaria immitis.**—*Proc. Soc. exp. Biol., N.Y.* **33.** 524-527. 2 graphs. [4 refs.]

I. Allowing the blood to coagulate and examining the serum for microfilariae was found to be a very satisfactory way of diagnosing filariasis in dogs. For some reason or other, the microfilariae appear to be concentrated in the serum, it is thought through their migration from the clot in the process of its formation. The preservation of microfilariae alive at refrigerator temperatures was also found to be more satisfactory in blood serum than in citrated blood, four samples having been found to contain living microfilariae after 9, 10, 12 and 15 days respectively.

II. This paper gives a brief account of the observations described more fully by the same authors in I.

III. Vaills reports on four cases of infestation with *D. immitis*. He recognizes three syndromes : a " cardiac syndrome ", the most frequent, caused by mechanical interference with the heart's action ; a " cutaneous syndrome ", represented by an ulcerous dermatitis caused by the presence of very numerous microfilariae in the capillaries of the skin, and an " encephalitic syndrome " characterized by somnolence and paresis, caused by microfilarial embolism of the cerebral capillaries.

IV. Two infected dogs were kept under observation for 11 days, during which time they were maintained in darkness and quiet in the hours of daylight and fed and exercised at night, their kennels being illuminated by electric light from 6 p.m. to 6 a.m. As a result of this reversal of the 24-hourly alternation of light and darkness, the daily maximum microfilarial count was found to be pushed forward about six hours.—E. L. TAYLOR.

IMMUNITY.

FREUND, J. (1936). **The Effect of Heterologous Bacterial Products upon Tuberculous Animals.**—*J. Immunol.* **30.** 241-253. 1 fig., 4 tables. [18 refs.]

The purpose of this paper was to study the quantitative aspects of the effect of filtrates from various species of bacteria upon normal and tuberculous guinea pigs and rabbits.

Guinea pigs were given small doses (0·001 to 0·0001 mg.) of human or bovine tubercle bacilli subcutaneously, while rabbits were given similar doses intravenously. The action of bacterial filtrates was tested two to four months later and the organisms used were *Bact. coli*, typhoid bacilli, and meningococci, 5 to 10 c.c. of filtrate being injected intravenously or intraperitoneally.

In tuberculous guinea pigs, symptoms of marked anaphylactic shock were obtained even with the smaller doses, while in non-tuberculous controls the injections usually caused only a mild disturbance. The minimum lethal dose was about five times lower for tuberculous than for non-tuberculous guinea pigs in the case of *Bact. coli* and *Salmonella typhi*.

With rabbits, typhoid and meningococcus filtrates were used and again the tuberculous animals were much more susceptible to the lethal action of the filtrates than the non-tuberculous. Symptoms resembling anaphylactic shock were not observed in the rabbits, though the autopsy findings were similar to those in the guinea pigs.

The author believes this effect of these bacterial products to be due to increased vulnerability of the blood vessels in tissues containing tubercles to a non-specific injurious substance.—A. ROBERTSON.

DYACHENKO, S. S. (1936). **A Contribution to the Problem of the Virulence ("VI") Antigen of** *B. Typhosus.*—*J. Hyg., Camb.* **36.** 108-113. 5 tables. [6 refs.]

The author shows that strains of *Salmonella typhi* which are not agglutinated by somatic "O" agglutinins are virulent and possess considerable protective action due to "Vi" antigen. Both virulence and inagglutinability seem to depend upon the presence in them of this antigen.—GWILYM O. DAVIES.

RAMON, G. (1936). Les vaccinations associées. Bases de la méthode. Résultats. Indications pratiques. **[Theory, Results and Practice of Associated Vaccinations].**—*Rev. Path. comp.* **36.** 792-814. 2 tables. [Numerous refs.]

The author reviews the development of vaccination methods during the last decade and shows how they have been improved owing to the discovery of anatoxins. The admixture of non-absorbable substances with antigens and the mixture of two or three unrelated antigens have been stages in the creation of stronger vaccinal response.

Technique, reinforcing injections, vaccinal response and indications for all these types of vaccination are described.—C. V. WATKINS.

HEIDELBERGER, M., & KABAT, E. A. (1936). **Chemical Studies on Bacterial Agglutination. II. The Identity of Precipitin and Agglutinin.**—*J. exp. Med.* **63.** 737-744. 2 tables. [16 refs.] [For abst. of previous article see this *Bull.* **5.** 227].

Although the unitarian theory of antibodies has gained general acceptance, quantitative evidence for the identity of agglutinins and precipitins has been lacking. The authors used Type 1 antipneumococcus horse serum and a quantitative micro-method for the estimation of precipitins and agglutinins. They found that the type-specific anticarbohydrate agglutinin and precipitin were not only present in identical amounts, but that a reduction in one was accompanied by a quantitative identical reduction in the other, providing evidence for their actual identity. More agglutinin than precipitin is found in purified antibody solutions, possibly owing to alteration of a portion of the antibody in the process of purification.—R. LOVELL.

I. MARTIN, L. (1934). **The Recent Trend towards a Differentiation between Allergy and Immunity, and the Relationship to Clinical Medicine.**—*Ann. intern. Med.* **8.** 483-496. 2 tables. [Numerous refs.]

II. —. (1935). **Allergy and Immunity.**—*Brit. med. J.* June 8th. 1176-1177. [3 refs.]

I. There has always been a tendency to consider allergy and immunity as interdependent conditions, but a critical review of more recent experimental evidence shows that this opinion is no longer tenable. It is necessary first to define certain immunological terms which have been subjected to misinterpretation.

Allergy applies to the delayed reaction following the inoculation of the sensitizing antigen ; anaphylaxis to the immediate response of sensitized smooth muscle cells making contact with the antigen ; hypersensitivity may be used in connexion with either or both of the foregoing terms. Immunity is " the making of an animal resistant to bacterial invasion or the effects of bacterial toxin ". Allergy can be no longer regarded as an essential factor in immunity, although the two conditions are so frequently present together.

The following are points which have recently been experimentally demonstrated. Immunity to staphylococci can be obtained without allergic reaction. Bacterial proteins as of the pneumococcus or tubercle bacillus can be made to promote skin reactions either with or without producing any immunity. While passive transference of immunity is simple, the allergic properties are not to be transmitted as well. The removal of the allergic sensitivity of immunized animals does not affect the immunity, indeed the reaction to a test inoculation is less marked as the inflammatory skin reactions are absent. Finally the theory that the allergic reaction prevents the dissemination of the test organisms is exploded by the fact that in both allergic immunes and non-allergic immunes the organisms remain clumped at the site of inoculation, and the removal of the majority of leucocytes from the blood stream does not bring about dissemination of the organisms.

II. This annotation refers to the above article, and also to the work of Fried, who suggests that lobar pneumonia is an allergic reaction because, after sensitizing rabbits to horse serum by repeated intraperitoneal injection, a subsequent intratracheal dose provoked a lobar pneumonia with acute inflammatory changes.

—Norman Hole.

Carlinfanti, E. (1936). Essais de désensibilisation des cobayes tuberculeux. **[The Desensitization of Tuberculous Guinea Pigs]**.—*C. R. Soc. Biol. Paris.* **121.** 304-305. [7 refs.]

Tuberculous guinea pigs, which reacted normally to the intradermal tuberculin test, received 0·025 c.c. of old tuberculin daily for ten days either subcutaneously or intradermally. After the second or third injection desensitization, as judged by the reaction obtained when 0·01 c.c. of tuberculin was injected intradermally, began to show itself and appeared to be complete after about the tenth injection. The phenomenon passed off in two or three days, its disappearance being hastened by the intraperitoneal injection of large doses of killed tubercle bacilli.

—F. Blakemore.

DISEASES, GENERAL.

I. —. (1936). **Report of Committee on Transmissible Diseases of Swine [U.S. Livestock Sanit. Ass.]**—*J. Amer. vet. med. Ass.* **88.** 337-338.

II. —. (1936). **Report of Committee on Tuberculosis [U.S. Livestock Sanit. Ass.]**—*Ibid.* 360-363.

III. —. (1936). **Report of Committee on Transmissible Diseases of Poultry [U.S. Livestock Sanit. Ass.]**—*Ibid.* 392-397.

IV. —. (1936). **Report of Committee on Tick Eradication [U.S. Livestock Sanit. Ass.]**—*Ibid.* 431-432. 1 table.

I. Heavy swine fever post-vaccinal losses were reported last season due to (1) the vaccination of pigs in too poor condition or actually diseased, and (2) the use of insufficient doses of antiserum.

Swine erysipelas is increasing in importance in the United States of America.

Differential diagnosis from swine fever frequently presents such difficulties that the use of laboratory tests is urged as opposed to reliance upon clinical opinion.

II. The difficulties of diagnosing Johne's disease are stressed, and on this account the condition is spreading gradually throughout the U.S.A. The johnin test has not proved very satisfactory, and no simple and really reliable test for diagnosing infection either *ante-* or *post-mortem* is available. The question was raised whether or not some bovines might acquire a mild unrecognizable infection from which they recovered completely.

III. The infectious diseases of poultry of economic importance are reviewed. The following points are of interest :– blackhead in turkeys may be controlled by completely segregating these birds from all other poultry ; paratyphoid infection of turkeys due to *Salmonella enteritidis* and *S. typhi-murium* is becoming increasingly important ; the problems connected with the eradication of *S. pullorum* infection are discussed ; the poultry raisers who hinder eradication are the small ones who ignore hygiene and the owners of immense hatcheries selling day-old chicks.

IV. The progress of tick eradication since 1906 is noted. Several areas had recently to be replaced in quarantine due to reinfestation. Wild deer act as an uncontrollable reservoir for the preservation of ticks, particularly *Boophilus* spp.

—E. J. Pullinger.

Holz. (1935-1936). Beiträge zur Pathologie des Zentralnervensystems. I. Endarteriitis obliterans als Ursache eines apoplektischen Insultes. II. Ependymitis granularis. III. Pseudokalkinkrustationen der Gefässe in Zentren des extrapyramidal-motorischen Systems. IV. Cholesteatosis cerebri. [**Pathology of the Central Nervous System. I. Endarteritis Obliterans as the Cause of Apoplectic Attacks in a Horse. II. Ependymitis Granularis. III. Pseudocalcification of Blood Vessels in the Extrapyramidal Centres. IV. Cholesteatosis Cerebri**].—*Berl. tierärztl. Wschr.* **51.** 768-769 and **52.** 114-116, 33-34 and 312-314. 12 figs. [Numerous refs.]

V. Holz. (1936). Neue Ergebnisse der Gehirnpathologie des Pferdes. [**Brain Pathology in the Horse**].—*Dtsch. tierärztl. Wschr.* **44.** 203-204.

I. This is a record of the *post-mortem* findings in the central nervous system of a horse which had shown apoplectic symptoms during life. Foci of softening were present in the thalamic and hypothalamic regions, due to severe trophic damage consequent on generalized vascular disease of a type considered by the author to be identical with endarteritis obliterans in man. Histologically, there was proliferation of the cells of the intima with destruction of the internal elastic lamina in the arterial vessels.

II. The author describes a very interesting case of ependymitis granularis in a 14-year-old stallion, with almost complete occlusion of the sylvian aqueduct by granulation tissue and marked dilatation of the lateral ventricles. There was proliferation of the ependymal cells and of the subependymal vessels with production of collagen fibres. Ganglion cells in various regions of the cerebrum showed degenerative changes. Attempts to transmit the disease to rabbits were not successful.

III. Two foci of pseudo-calcification, the size of cherry stones, were found in the nucleus dentatus of a 14-year-old horse. Similar lesions were also present in the globus pallidus. The author considers these lesions to have been the probable cause of the slight brain disturbances which were observed during life.

IV. Examination of the brains of horses that had died of Borna disease revealed foci of cholesterol deposition situated mainly in the region of the corpus striatum and Ammon's horn. Microscopically, the lesions bore a marked resem-

blance to the cholesterol " tumours " commonly found in the lateral ventricles in the horse. It is suggested that a study of the formation of these deposits might be expected to throw light on the pathogenesis of " cholesteatomata ".

[It is probable that the " tumours " commonly, but mistakenly, termed " psammomata ", " cholesteomata ", etc., are not true neoplasms, but are the result of chronic inflammatory changes leading to cholesterol deposition in the choroid plexus and elsewhere].

V. In the course of this discussion at the Berlin Veterinary Society, Holz gave a useful classification of the so-called " Kopfkrankheit " commonly seen in horses in south Germany. The condition is classified according to its pathology into specific infections (*e.g.*, Borna disease) and apoplectic attacks. In both, cerebral haemorrhages are the most important lesions. In the former, they result from the action of the virus on the vessel walls or they follow softening of areas of brain tissue due to nutritional disturbances. In apoplexy, the haemorrhages may be due to a variety of causes, including calcium incrustation of vessels, capillary thrombosis and cerebral tumours.—E. G. White.

Eilmann, H. (1936). Infektiöse Anämie bei zwei tuberkulose kranken Pferden und Genese der dabei auftretenden Endokard- und Intimaverkalkungen. [**Vascular Endothelial and Intimal Calcification in Horses affected with Tuberculosis as well as with Infectious Anaemia**].—*Dtsch. tierärztl. Wschr.* **44.** 195-200. 6 figs. [Numerous refs.]

In the horse, infectious anaemia and tuberculosis are commonly found occurring together. The author gives a detailed account of the *post-mortem* findings in two such cases. In both animals there was a " complete tuberculous primary complex " (" Primäraffekt ") in the large intestine and associated lymph glands, with secondary involvement of the liver, spleen and lungs. In one animal there was marked calcification of the endocardium and of the intima of various arteries (especially of the left coronary). Such calcification is stated to be fairly common both in tuberculosis and in infectious anaemia, due presumably to disordered calcium metabolism.—E. G. White.

I. Biester, H. E., Eveleth, D. F., & Yamashiro, Y. (1936). **Intestinal Emphysema in Swine.**—*J. Amer. vet. med. Ass.* **88.** 714-731. 7 figs., 7 tables. [2 refs.]

II. Kernkamp, H. C. H. (1936). **Epithelial Diverticula in the Large Intestine of Swine.**—*Ibid.* 732-736. 3 figs. [1 ref.]

I. The authors claim to have established a relation between intestinal emphysema (pneumatosis cystoides intestini) in pigs and the feeding of polished rice.

Pigs fed for three months on a diet containing 20 per cent. of dried skimmed milk failed to develop the condition. Emphysema was found in 16 out of 22 pigs fed for periods of from three to five months on diets containing from 75 to 90 per cent. of polished rice and the proportion of animals developing the condition was considerably higher if only those animals which weighed more than 100 lb. when feeding was begun were taken into account. Five control animals on a diet free from rice did not develop the condition ; further controls were used but are not included in the tables. The macroscopic and microscopic characters of the condition are described and illustrated. No abnormality was found in the cellular or chemical composition of the blood of the animals developing emphysema and bacteriological examination of the lesions gave a negative result. The condition is suggested as being due to an increased permeability of the small intestine for

gas, but whether this is caused by the presence of a toxic substance or by lack of some protective agent (deficiency of vitamin B was excluded) is not known.

II. A description of small nodules, usually multiple, occurring not uncommonly in the large intestine of pigs. Microscopically, they consist of diverticula, situated in the mucosa and resembling crypts or cysts in form. They are lined by columnar epithelium resembling that of the intestine, with which they usually communicate. The lumen of the diverticula may contain mucinous material derived from goblet cells in the epithelium. The nodules may undergo necrosis and liquefaction. They are believed to arise in the embryo as developmental errors.—E. G. White.

—. (1935). Sterilitá bovina. [**Bovine Sterility**].—*Boll. Min. Interno.* No. 1. p. 99. [Abst. from abst. in *Azione vet.* **5.** 96-97].

A summary of the Circular of the Ministry of the Interior, Italy, dated November 22nd, 1935. The ministry has, since 1926, actively combated the serious effects of sterility in cattle, mainly on a curative basis. The southern provinces and the islands have not reported abnormal sterility, but in about 50 districts good work has been done by specialists who have instructed local practitioners, by travelling clinics in charge of specialists, and by the distribution of pamphlets. This campaign is to be developed and directed especially against the pathological causes – chiefly lesions of the genital system [no organism is mentioned]. Provincial authorities are to report on sterility in their territory and to make proposals for the sending of specialists. The Stazioni Sperimentali Zooprofilattiche will continue and intensify their work.

Bennetts, H. W. (1935). **The Prevention of So-Called "Rickets" in Lambs and Foals [Enzootic Ataxia].**—*J. Dep. Agric. W. Aust.* **12.** 305-310. 1 table. [2 refs.]

Bennetts previously described this ataxic condition of lambs, known locally as "rickets", and reported beneficial results from the administration of ammonium chloride to the ewes during gestation [this *Bull.* **6.** 258]. The use of ammonium chloride arose from the author's hypothesis that the disease was due to lead poisoning.

Foals bred in the districts where lambs show ataxia also become affected with a somewhat similar condition, though with foals the principal lesions are joint weakness and enlargement. Ammonium chloride was administered to several mares towards the end of gestation and subsequently they produced normal foals, whereas foals from other mares not so treated were badly affected. Affected foals recovered rapidly when ammonium chloride was given to their dams or to themselves. Although it has not been shown that the condition in lambs is identical with that in foals, nor have the cause or causes been ascertained, preventive treatment based on the assumption that both are lead poisoning has given very promising results.—W. I. B. Beveridge.

McCance, R. A. (1936). **Medical Problems in Mineral Metabolism. I. Legacies of Evolution. II. Sodium Deficiencies in Clinical Medicine. III. Experimental Human Salt Deficiency.**—*Lancet.* **230.** 643-650, 704-710, 765-768 and 823-830. 1 fig., 15 tables. [Numerous refs.]

—. (1936). **Ashes and Water.**—*Ibid.* 847-848.

The first three articles constitute the Goulstonian Lectures for 1936. The author deals with calcium, phosphorus, iron, sodium and potassium, concentrating

chiefly on sodium deficiency and pointing out the resemblance of this to symptoms occurring in Addison's disease. The articles deserve close reading.

The fourth article is a brief annotation on the above lectures.—RUTH ALLCROFT.

PUBLIC HEALTH.

I. KERN, H. G. (1935). Beitrag zur Untersuchung der Handelsmilch im Regierungsbezirk Magdeburg unter besonderer Berücksichtigung der Züchtung der Abortus Bang-Bakterien. [**Examination of Commercial Milk in Magdeburg with Special Reference to** *Brucella abortus*].—*Inaug. Diss., Berlin.* pp. 32. 5 tables. [Numerous refs.]

II. GRAHAM, R., & TORREY, J. P. (1936). **A Survey of the Incidence of Brucella in Pasteurized and Unpasteurized Market Milk in Illinois.**—*J. Amer. vet. med. Ass.* **88.** 614-623. 1 fig., 2 tables. [Numerous refs.]

III. ROOTS. (1936). Die Brucellose und Milchproduktion. [**Brucella Infection and Milk Production**].—*Suom. Eläinlääkäril.* **42.** 65-74. 3 tables. [In German].

IV. KLIMMER, M., & KLITZSCHMÜLLER, P. (1936). Zum züchterischen Nachweis von Abortus-Bang-Bakterien in der Milch. [**Cultural Demonstration of** *Br. abortus* **in Milk**].—*Berl. tierärztl. Wschr.* **52.** 326-329. 4 tables. [Numerous refs.]

I. A comparison of various methods of recognizing the contamination of market milk with tubercle bacilli and *Br. abortus*. [Insufficient experimental data are recorded to enable the value of the investigation to be judged].

II. Brucella were isolated from about half of 62 raw bulk milk samples collected from 28 depots in Illinois. No infection was found in 31 samples of pasteurized milk. The high contamination of bulk samples is explained by the fact that a single infected cow can contaminate large volumes of clean milk.

III. A recapitulation of information regarding udder infections with *Br. abortus*. Figures are quoted showing that this infection reduces the milk yield by 25 per cent. or more, even in cases of latent infection.

IV. Various techniques for the cultivation of *Br. abortus* from milk have been compared and, as a result, the following method is recommended. Boracic acid (1 per cent.) is added to the sample which is then mixed with some strong brucella-agglutinating serum. The mixture is incubated at 37°C. for two hours and is then centrifuged. The deposit, containing agglutinated clumps of brucella, is seeded on to liver agar containing gentian violet and malachite green in suitable proportions.—E. J. PULLINGER.

CRABTREE, J. A., & LITTERER, W. (1934). **Outbreak of Milk Poisoning Due to a Toxin-Producing Staphylococcus Found in the Udders of Two Cows.**—*Amer. J. publ. Hlth.* **24.** 1116-1122. 4 tables. [2 refs.]

This report refers to a series of outbreaks of acute food poisoning amongst the staff and students of a boarding-school. Seven outbreaks occurred, making a total of 242 cases in 97 persons. The attacks occurred about three hours after a meal, were of short duration and were afebrile in nature. A detailed investigation suggested milk infection, the milk being produced on the school farm. Bacterial examinations of the milk, made every other day for five weeks, showed the almost consistent presence in the milk of two cows of a large number of haemolytic *Staphylococcus aureus* similar to those cultured from the vomitus and throats of individuals. Filtrates from the cultures gave rise to illness when fed to human

volunteers. The outbreaks ceased with the removal of the cows and improved refrigeration.—GWILYM O. DAVIES.

I. BELLER, K. (1935). Hühner- und Enteneier als Ursache von Lebensmittelvergiftungen. [**Food Poisoning from Hens' and Ducks' Eggs**].—*Reichsgesundheitsblatt.* **10.** 940-942.

II. EDWARDS, P. R. (1935). **The Antigens of Salmonella anatum.**—*J. Bact.* **30.** 269-276. 3 tables. [11 refs.]

III. JANSEN, J. (1936). Agglutination mit Dottersubstanz bei Entensalmonellose. [**Agglutination Tests with Egg Yolk in Duck Paratyphoid**].—*Dtsch. tierärztl. Wschr.* **44.** 340-341. [12 refs.]

I. Discussion of the public health significance of bacterial contamination of eggs, particularly contaminants causing enterotoxaemia in human beings.

II. An account of two strains of *S. anatum* having an abnormal somatic antigenic structure. A new somatic component is described. [Factor XII, the identification number applied by the author, is inadmissible since number XII has already been used by KAUFFMANN].

III. Specific agglutinins may be demonstrated in the yolk of eggs which have been laid by birds having a high blood agglutinin titre to members of the *Salmonella* genus. Such agglutinins may be demonstrated by mixing yolk and antigen on a warmed glass slide. [This test is an index of antibody content of the blood of the bird and does not indicate bacterial contamination of the egg].—E. J. PULLINGER.

THERAPEUTICS AND MATERIA MEDICA.

BROWNING, C. H. (1935). **Chemotherapy – the Progress of Thirty Years and the Prospect.**—*Glasg. med. J.* **124.** No. 5. pp. 1-16 of Transactions.

The author first emphasized that few chemotherapeutic agents produce their results, if any, by simply killing the organisms in the body of the host in the same way as mercuric chloride or carbolic acid destroys a bacterial culture in a test tube. In the presence of the drug neither the parasite nor the host is entirely passive. The infections which have hitherto proved most susceptible to chemotherapeutic agents are those due to protozoa. It has been possible to follow changes in their morphological features as these organisms are relatively large. The chief active substances are (1) dyes of various classes (trypan red and trypan blue; parafuchsin and tryparosan; "trypaflavine"); (2) steryl quinoline derivatives and compounds of arsenic, especially with an organic moiety (*e.g.* atoxyl, "tryparsamide"), and (3) the "salvarsan" series, including compounds of antimony and bismuth.

The marked specificity of chemotherapeutic agents is discussed and illustrated. Organisms exposed repeatedly to the action of a drug become *drug-fast* and their capacity to fix dyes becomes diminished or disappears. Drug resistance, when once acquired, is retained by the parasite practically indefinitely and persists after passage through the insect vectors which naturally transmit the infection.

The part played by the host organism in the chemotherapeutic effect is described; antibodies are formed in the serum when protein constituents are released following the death of the parasites. This immunity may be of value in assisting the complete process of sterilization. With regard to the malarial amoebae, drug resistance is not the prominent feature that it is with trypanosomes and the mechanism of cure is obscure. Some species of piroplasma of dogs and cattle are very susceptible to trypan blue and "trypaflavine". The discovery of "salvarsan"

is described and the application of chemotherapeutic agents to other spirochaetal diseases is discussed. In the case of *Tryp. pallidum*, drug fastness does not, to any serious extent, develop during treatment. The use of drugs in bacterial infections is discussed; they are rarely of value in general infections but great progress has been made in their use in local infections.—J. M. ROBSON.

ARGUN, T. (1936). Anaplazmozda kan levhasinin degismesi ve " acaprin " ile tedavi üzerinde bir görüm. [**Variations in the Blood Picture during Treatment of Anaplasmosis with " Acaprin "**].—*Askerî tibbi baytarî mecmuasi.* **13.** 252-258. 1 fig., 1 table, 1 chart. [6 refs.] [Abst. from German summary].

A report of a case of anaplasmosis in a well-nourished milch cow that had been grazing on tick-infested pasture. The cow was put under observation for 14 days at a clinic and four blood tests were taken. On the first day *Anaplasma marginale* was found in 25 per cent. of the erythrocytes; anaemia was present and increased each day. There were further changes on the fifth and eighth days. The number of erythrocytes had fallen by half and the blood picture showed signs of pernicious anaemia. Intramuscular injections of " acaprin " effected a speedy recovery.

GERKE. (1935). Versuche mit Entozon an galtkranken Kühen. [**Treatment of Mastitis with " Entozon "**].—*Z. InfektKr. Haustiere.* **48.** 95-108.

The author reports success in the treatment of streptococcal mastitis with " entozon ". Treatment is preferably carried out when the animals are dry or just going dry. " Entozon " at a strength of 1 : 1,250 was used, and two injections at an interval of a week were usually successful in eliminating streptococci from the udder but, occasionally, three, four or five injections were necessary. It was found useless to treat quarters in which there were considerable clinical and anatomical changes. Strict hygienic measures, together with frequent bacteriological examination of the milk, are necessary for the eradication of mastitis. —N. J. SCORGIE.

FRENEY, M. R., MACKERRAS, I. M., & MACKERRAS, M. J. (1936). **Further Observations on Glycerine-Boric Acid Dressings for Fly-Struck Sheep.**—*J. Coun. sci. industr. Res. Aust.* **9.** 11-18. 3 tables.

The preparation of and preliminary experiments with glycerin-boric acid preparations as dressings for fly-struck sheep have already been reported [this *Bull.* **6.** 548]. Crude glycerin has been found unsuitable for making the dressings but dilution with up to 25 per cent. ethyl alcohol, which may be partly denatured with 5 per cent. methyl alcohol, effected a decided improvement in the consistency and other properties of the dressings.

Glycerin-boric acid dressings have now been tested on 333 strikes and the results have proved highly satisfactory. Re-strike could not be established on treated areas under a month after the application of the dressings, either pure or diluted with alcohol. Similarly, 33 attempts to produce strike on areas of normal fleece treated with glycerin-boric preparations between 35 and 81 days previously were unsuccessful, except in one case where a small strike developed. The prophylactic use of the dressings, especially on rams' heads, is suggested.—W. I. B. B.

SCHLICHTING, H. (1935). Experimentelle Untersuchungen über den Einfluss des Insulins auf den Verlauf der alimentär-hyperglykaemischen und hyperalkoholaemischen Kurve. [**Influence of Insulin on Alimentary Hyperglycaemia and Hyperalcoholaemia**].—*Inaug. Diss., Berlin.* pp. 18. 5 tables, 15 charts. [6 refs.]

It is probable that alcohol is an intermediate product in the break-down of sugar by the body and it is known that under certain conditions it can replace sugar for the production of heat. It cannot, however, be used by muscles doing active work and its main function is to maintain the carbohydrate reserve of the body. Since the metabolism of alcohol and sugar are so closely linked, it is probable that insulin regulates that of the former as it does that of the latter. In order to study this point, the author gave alcohol and alcohol with glucose by the mouth to a series of fasting rabbits and estimated the rate of disappearance of these substances from the blood by means of Widmark's micro-method. The experiments were repeated on animals which were given insulin subcutaneously at the same time as they received the alcohol and glucose. The more rapid disappearance of glucose which was to be expected was accompanied also by a more rapid disappearance of alcohol from the blood.—J. A. Nicholson.

Rice, J. W. (1934). **The Effect of a Caustic Hypochlorite on the Tubercle Bacillus as an Index of the Efficiency of Chemical Sterilization of Dairy Utensils.**—*Rep. Penn. Ass. Dairy Milk Insp.* No. 10. pp. 40-46. [Abst. from abst. in *Exp. Sta. Rec.* **74.** 102].

The author finds that the caustic hypochlorite antiformin kills tubercle bacilli in ten minutes of contact if used undiluted in a relationship of 1 : 5 parts of tuberculous sputum, but states that its cost prohibits its use in these conditions as a chemical sterilizer of dairy utensils. It is, moreover, too corrosive to tissues to allow hand manipulation in great concentration.

POISONS AND POISONING

Bennetts, H. W. (1935). **An Investigation of Plants Poisonous to Stock in Western Australia.**—*J. Dep. Agric. W. Aust.* **12.** 431-441. [2 refs.]

The author tested the toxicity for sheep of 51 species of plants, in most instances by feeding the flowers or by drenching with an extract made from them. The majority of the plants tested comprised members of the genera *Oxylobium* and *Gastrolobium*. Twenty species of these genera proved toxic, these being mostly confined to Western Australia. It was concluded that the toxic principles of all these species are identical or at least similar. Two main syndromes and an intermediate type were produced. The dose of toxic principle apparently determined which syndrome resulted, large doses producing " A " type. This type was characterized by pronounced hyperexcitability and mania usually leading to death in from a few minutes to two hours. The " B " syndrome was characterized by depression and muscular weakness, death occurring sometimes after several hours but usually after one to four days. Sometimes both syndromes were seen in the one animal. At *post-mortem* examination the outstanding features were general congestion and delayed clotting of the blood. Petechiae were sometimes found in the gall-bladder and small and large intestines, while the lungs almost invariably showed large haemorrhagic areas at the base on both sides.

The whole flowering plant of *Isotropis cuneifolio* was also found toxic, the symptoms and lesions being those of haemorrhagic gastro-enteritis. *Crytandra leucophracta* produced chronic nervous symptoms suggestive of degenerative changes. Drenching with an extract of leaves of *Duboisia Hopwoodii* produced death within two hours, the principal symptom being muscular weakness. *Senecio lautus* produced some cirrhosis of the liver in one sheep.—W. I. B. B.

BENDINGER, G. G., & JURKOW, M. I. (1935). Beitrag zur Runkelrübenvergiftung bei Schweinen. [**Beet Poisoning in Swine**].—*Tierärztl. Rdsch.* **41.** 695-697. [9 refs.]

Three outbreaks of sugar-beet poisoning in swine are recorded. In the first outbreak, eight out of 48 died ; in the second, 11 died out of 19 affected and, in the third, out of 90 animals, 70 were affected and 23 died. In these cases it was the roots with some leafy stalks attached which caused the poisoning : they had been stored badly and been subjected to frost and mould and were fed in large quantities when the pigs were hungry. The pigs showed great distress with vomiting 30 minutes later and in fatal cases died in coma in an hour. Chocolate-coloured blood pervaded all the body organs of dead pigs. Intense gastritis was also present.

Although oxalic acid is believed to be the toxic principle in beetroot leaves, it is more scanty in the roots and could not be incriminated as the sole cause of death in the cases recorded above.—G. D. SHEARER.

MATHEWS, F. P. (1936). **The Toxicity of Broomweed** (*Gutierrezia microcephala*) **for Sheep, Cattle and Goats.**—*J. Amer. vet. med. Ass.* **88.** 55-61. 3 figs., 1 table. [2 refs.]

Sheep, cattle and goats died as a result of eating broomweed in the fresh or dry state. Poisoned sheep showed general depression and in severe cases there was haematuria accompanied by icterus of the sclera of the eye.

Autopsy of dead animals revealed icterus of the " tendinous portions of the body ", severe nephritis and a yellow mottled liver.

These results disagree with previous feeding tests of other workers, who found the plant non-poisonous.—G. D. SHEARER.

—. (1934). **Effect of Yellow-Wood on Sheep.**—*Pastoral Rev.* **44.** 1249.

Ten sheep were fed on leaves of the tree " yellow wood ", supplemented with lucerne hay. After being fed thus from five to nine weeks, three of them developed peculiar nervous symptoms resembling a condition occurring naturally in the district. When startled or made to run, an affected sheep would suddenly drop in its tracks as though stunned, and lie trembling and rigid. The attack would only last ten to 40 seconds and, after struggling to its feet and standing trembling for a few seconds, the sheep would run about normally. No deaths occurred following the nervous symptoms ; two of the sheep died apparently from impaction.
—W. I. B. BEVERIDGE.

PHYSIOLOGY.

CORKILL, A. B. (1936). **The Relationship of the Pituitary Gland to Carbohydrate Metabolism.**—*Med. J. Aust.* Feb. 1st. 168-172. [6 refs.]

Briefly reviewing the more recent work, the author considers it safe to assume that hypophysectomy interferes with those normal mechanisms concerned with the protection of the body from hypoglycaemia. This influence is attributed chiefly to the anterior lobe, but it is pointed out that the posterior lobe also bears some relationship to carbohydrate metabolism. It is remarked that the advance of our knowledge of the relationship of the pituitary gland to carbohydrate metabolism has not been accompanied by any therapeutic advance in the treatment of diabetes.—R. H. WATSON.

MARSTON, H. R. (1935). **On Some Physiological Aspects of the Phosphorus Metabolism of the Sheep.**—*J. Coun. sci. industr. Res. Aust.* **8.** 293-304. 1 table. [Numerous refs.]

An endeavour to bring together some experimental evidence which bears on the problems associated with the dietary requirements of sheep from a practical grazing standpoint. The P requirements, the factors which affect the utilization of P, the symptoms of P deficiency, and P deficiency as it occurs under conditions of natural grazing in Australia, are discussed. Under conditions of natural grazing there is, in general, a co-existent lack of protein and it is this lack of protein which generally becomes the limiting nutritional factor. Where, however, an occasion arises in which the use of phosphatic licks is indicated, it is suggested, on the basis of experiments on the effect of various levels of the fluorine intake, that the finely ground rock phosphate originating from either Christmas Islands or Curaçao Island would provide the most economic source of supply of P.—R. H. WATSON.

GALLOWAY, I. A. (1936). **Notes on the Hydrogen-Ion Concentration of the Urine of Herbivora.**—*Vet. Rec.* **48.** 636-637. [3 refs.]

Since the pH of urine can be largely influenced by diet, attention must be paid to this factor in following the course of a pathological condition due to a virus sensitive to small variations in pH. Daily variations from pH 5·0 to 8·0 occurred in normal dairy cows, without relation to milking or feeding times. Repeated catheterization of guinea pigs had no influence *per se* upon the reaction of the urine. —ALFRED EDEN.

TECHNIQUE.

LLOYD, G. (1936). **Nerve Suture.**—*J. R. Army vet. Cps.* **7.** 121-137. 3 figs. [8 refs.]

This article deals only with nerve suture as applied to the relief of roaring in horses. It reviews the attempts made from time to time to bring about re-enervation of the paralysed or semi-paralysed left recurrent laryngeal nerve by its suture (a) to the common trunk of the vagus and sympathetic nervous system ; (b) to the spinal accessory nerve, and (c) to the phrenic nerve. The greater part of the paper, however, is an account of recent work in connexion with phrenic-recurrent laryngeal suture. The author gives details of four operations carried out by him since 1933 on horses which were roarers. Some degree of improvement was effected in two of them. The other two died of post-operative complications. He concludes that the operation, though a practical proposition, is only likely to prove of value when carried out in the initial stages of degeneration of the recurrent laryngeal nerve, prior to the onset of fibrous changes in the crico-arytenoideus posticus muscle. —C. DAVENPORT.

BENAVIDES, J. (1934). **Comments and Procedure on Thick Blood Film Technic.**—*J. Lab. clin. Med.* **20.** 289-295. 2 figs. [6 refs.]

A description of the technique of the thick film method.—GWILYM O. DAVIES.

MISCELLANEOUS.

GILRUTH, J. A. (1935). **Veterinary Organization in Soviet Russia.**—*Aust. vet. J.* **11.** 210-211.

The livestock figures for the Soviet Union and Australia are contrasted.

Figures showing the extraordinary reduction in numbers of sheep in the U.S.S.R. between 1928 and 1934 are given. A comparison is made between the degree of development of veterinary education and research services in pre-war Russia and that of the present day.

Under the Soviets, rinderpest has been completely controlled, while contagious pleuro-pneumonia of cattle and glanders in horses are on the eve of being definitely suppressed.—I. CLUNIES ROSS.

EBERBECK. (1936). Zwei Jahre Lehrer an der Heeres-Veterinär-Akademie (Army Veterinary College) in Peking. [**Two Years' Experience as Instructor at the Army Veterinary College in Peking**].—*Dtsch. tierärztl. Wschr.* **44.** 158-162. 2 photographs.

The author was the first European veterinarian to act as instructor in veterinary medicine to Chinese students at the only veterinary school in China. There is no private practice in China and the only field of work is that associated with the army, but plans have been made to found a state veterinary service to deal with epizootic diseases.

The course of instruction at the Peking College lasts four years and 200 students were enrolled during the author's appointment. The difficulties in teaching are described.

On a tour of the provinces of Kansu and Shensu, the author observed the following diseases :- glanders, anthrax, foot and mouth disease, swine fever, rabies, dog distemper, mange in horses and cattle, rickets in horses, horse bot infestation, contagious bovine pleuro-pneumonia and sheep pox. Tuberculosis and trichinosis are unknown.—J. E.

KELLEY, R. B. (1935). **Zebu (Brahman) Cross Cattle and their Possibilities in North Australia. Co-operative Investigations in Queensland.**—*Progr. Rep. Coun. sci. industr. Res. Aust.* No. 1. pp. 33. 1 text fig., 12 figs. on 6 plates, 3 tables. [6 refs.]

Following the publication of the author's observations on British-zebu breed crosses in the United States of America, 18 zebu cattle have been introduced into Queensland. In this report Kelley describes the importations and outlines his plans for investigating the possible advantages to be derived from crossing them in various ways with the British breeds at present used exclusively in Queensland for beef production.

The zebus have been allocated to four properties representative of the principal cattle producing areas in tropical Queensland. They are being crossed and back-crossed with Herefords, Shorthorns and Red Polls, and the progeny from these various " exploratory matings " will be carefully observed to determine what is the most desirable hybrid.

In the course of making the " exploratory matings " the foundation will be laid for some 20 different families which can subsequently be used for stabilizing the desirable hybrid, the family system being advocated for this purpose.
—W. I. B. BEVERIDGE.

GREENHILL, A. W. (1936). **A Study of the Relative Amounts of the Protein and Non-Protein Nitrogenous Constituents Occurring in Pasture Herbage, and their Significance in the Grazing of the Herbage by Stock.**—*Bio-chem. J.* **30.** 412-416. 1 table. [12 refs.]

The total nitrogen content of the herbage ranged from 2·8 to 5·2 per cent. of the dry matter ; the non-protein-nitrogen values, expressed as percentages of the

total nitrogen, ranged from 12 to 23, the amide-nitrogen from 2·7 to 8·1, the ammonia-nitrogen from 1 to 2 and the nitrate-nitrogen from 0·1 to 4.

It is concluded that the proportion of the total nitrogen present in protein form in intensive herbage as grazed by stock is normally more or less constant at a value between 80 and 90 per cent., and that only in exceptional instances does the non-protein-nitrogen exceed 20 per cent. of the total nitrogen. It is probable that an unusually high proportion of non-protein-nitrogen in grazing herbage is likely to arise only under a peculiar combination of circumstances, such as heavily manured grass under conditions of very rapid growth, or when, after heavy manuring followed by a check to growth, growth suddenly recommences. Such conditions may cause digestive disturbances in stock grazing the herbage.—RUTH ALLCROFT.

SIMMONS, S. W. (1935). **The Bactericidal Properties of Excretions of the Maggot of** *Lucilia sericata*.—*Bull. ent. Res.* **26.** 559-563. 1 table. [15 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **11.** 319. Signed J. C. CRUICKSHANK].

A suspension of the excretions of the blowfly maggot, sterilized by autoclaving, was tested for bactericidal action by adding to 5 cc. of suspension 0·1 cc. of a 24-hour broth culture of various organisms. *Staph. aureus*, *Str. pyogenes*, *Str. faecalis*, *Proteus* and *Bact. typhosum* were thus tested, and, by a slightly different technique, *Cl. welchii*. In every case there was no growth when small quantities were transferred to broth or plated after about 5–10 minutes. A single test appeared to show that the bactericidal agent was still active against *Staph. aureus* after desiccation.

MROWKA, E. (1935). Zum Kausalbegriff in Physik, Medizin und Biologie. **[The Conception of Cause in Physics, Medicine and Biology].**—*Arch. wiss. prakt. Tierheilk.* **69.** 453-473. [Numerous refs.]

The author comments on the similarity of the results obtained by DOBBERSTEIN and PIENING [this *Bull.* **5.** 809.] in attempts to transmit bovine lymphadenitis, and those which he obtained working with equine infectious anaemia. In both cases the blood changes might be transmitted but the anatomical picture of the disease might not be produced. It has been suggested that an unknown auxiliary cause might be involved which might be a chemical substance. It is stressed, however, that a non-living inorganic substance cannot multiply, but can only change its form or shape.

Returning to the conception of a cause, the nature of cause and effect is discussed in relation to inorganic changes and to changes occurring in unconscious and conscious living matter. In inorganic matter each change, as effect, follows of necessity out of some previous change as cause, the amount of the effect being dependent upon the amount of the cause.

In unconscious life, change, as effect, is produced by a stimulus, and cause and effect are not equal ; a small increase in the stimulus may produce a very big effect or it may eliminate all effect. In conscious life the effect is governed by the will. Since in unconscious life an effect is the result of a stimulus, it is argued that the tubercle bacillus cannot be the cause of tuberculosis any more than an egg is the cause of a chicken. All diseases, without exception, are the result of a stimulus, and before our knowledge of them can be complete, we must know the essential stimulus which produces the effect, and gives the materials power to produce the results.

The anatomical changes produced in disease should be regarded, not as host reactions, but as the development of the excitor, and can only occur when it finds the cause which is necessary for its development in the organs. It is suggested

that in this lies the explanation of the existence of the tubercle bacillus in the absence of tuberculosis, and the presence of unknown viruses in the absence of anatomical changes.—U. F. RICHARDSON.

RIDDLE, O. (1936). **The Confusion of Tongues.**—*Science.* **83.** 41-45 and 69-74.

The author discusses the contribution made by the development of the idea of evolution to the biological sciences, especially to anthropology and the various medical sciences. The questions of the origin of life and of the origin of consciousness are considered in the light of modern knowledge of the phenomenon of evolution. Recent discoveries in our knowledge of organic synthesis, viruses, and hormones are quoted as contributing to those questions. Recent developments in genetics and nutrition are also quoted and discussed in relation to the process of evolution.—A. ROBERTSON.

OFFICIAL AND OTHER REPORTS.

SOUTH AUSTRALIA. (1935). **Report of the Stock and Brands Department for the Year ending 30th June, 1935.** [LOXTON, C. A.] pp. 4. 4 tables. [fcp].

The general health of the livestock has been good and there have been no serious losses from notifiable diseases.

Two outbreaks of bovine pleuro-pneumonia occurred, involving quarantine of 338 cattle. Among the cattle slaughtered at the abattoirs the incidence of tuberculosis was 1·87 per cent., while out of 372 cattle tested with tuberculin, 15 reacted. Bovine contagious abortion was eradicated from three herds by means of the agglutination test. An outbreak of avian tuberculosis was detected on a poultry farm, this being apparently the first time avian tuberculosis has been reported from South Australia.—W. I. B. BEVERIDGE.

INDIA. (1935). **Annual Administration Report of the Army Veterinary Service for 1934-35.** [MOSLEY, H. S.] pp. 18. 13 tables. Simla: Govt. India Press. [8vo].

This report is divided into four parts. Part I is entirely statistical and comprises three tables showing (1) the number of army animals in India and Burma during the year under report; (2) particulars of non-specific diseases recorded, and (3) outbreaks of specific diseases. The animal strength is given as horses 32,329, mules 27,033, camels 3,854, cattle 9,458 and donkeys 134, making a total of 72,808. Part II, which is very brief, refers to the progress made with the indianization scheme for officer personnel. It also gives details of the courses of instruction in animal management held at the army veterinary schools. Part III contains short notes on certain of the more prevalent diseases, *viz*, colic, equine encephalomyelitis, ringworm, bursatti, catarrh and variola. Part IV, which is of greater length, reports on the outbreaks of contagious diseases under their several headings. Some original observations are recorded in connexion with equine influenza and strangles.

The paper ends with an article entitled " The Incidence of Bone Diseases Liable to cause Chronic Disability among Australian and Indian Horses and a Comparison between the Two Breeds ", an original piece of work of considerable interest and value.

It was found that in the early years of service the admissions for treatment were higher in the Indian than in the Australian horses and that after six years' service the position was reversed. The data are dealt with in several tables showing numbers and percentages.—C. DAVENPORT.

INDIA. (1936). **Annual Report of the Imperial Institute of Veterinary Research, Muktesar for the Year ending 31st March, 1935.** [WARE, F.] pp. 59. 8 tables. New Delhi: Govt. India Press. [8vo] [Rs.1·10] [2s. 9d.]

The report is divided into five sections, one of which relates to the sub-station, the Imperial Veterinary Serum Institute at Izatnagar.

In the first section the Director deals with the staff, supplies and services at Muktesar, production, instruction, research, publications and finance. The institute, which has been established on generous lines and has great possibilities, is suffering from lack of the necessary staff for research work. The post of Protozoologist has not yet been filled and the charge of the Pathological Section is held temporarily. Other appointments are vacant, though sanctioned.

There is a very large output of biological products from the institute. Antic rinderpest serum continues to be the main production, but it is stated that, owing to the extended use of virus, there is a decreasing demand for it. Haemorrhagic septicaemia vaccine and blackleg vaccine were issued in considerable quantities. A notable amount of mallein and tuberculin (especially avian) was produced.

REPORT OF THE SEROLOGY SECTION. [HADDOW, J. R.] Work in connexion with the improvement of methods of anti-rinderpest serum was continued. Progress is reported in the preparation of a suitable rinderpest vaccine. Other work in this section comprised experiments to simplify and improve the manufacture of blackleg vaccine and investigations in bovine contagious abortion, bovine lymphangitis, bovine mastitis, equine contagious abortion, strangles, equine influenza, Ranikhet disease [Newcastle disease] of fowls and fowl pox were conducted. Physiological studies included work in connexion with amaurosis in calves, osteomalacia in cattle, and aphosphorosis, paraplegia and ophthalmia in horses. A considerable amount of routine work was carried out.

REPORT OF THE PATHOLOGY SECTION. [DATTA, S. C. A.] Considerable attention was paid to enzootic bovine haematuria. In addition to a large amount of routine examination work, research was conducted in tuberculosis, Johne's disease and other pathological and bacteriological conditions.

REPORT OF THE PROTOZOOLOGY SECTION. [WARE, F.] Experiments were conducted in the treatment of surra and theileriasis in cattle.

It is recorded that S. K. SEN of this department, working on study leave at the Molteno Institute, Cambridge, had been able to demonstrate the exact nature, not previously recorded, of the blood-sucking apparatus of ticks.

A number of papers by members of the staff were published during the year under report.—G. K. WALKER.

INDIA, PUNJAB. (1936). **Annual Report of the Civil Veterinary Department for the Year 1934-35.** [QUIRKE, T. F.] pp. 36 + xx. 10 figs. on 5 plates, 30 tables. Lahore: Supt. Govt. Printing. [8vo] [Rs. 1·8]. [2s. 3d.]

The staff employed in the districts and on the government farm consisted of the director of veterinary services, five superintendents, 13 deputy superintendents and 382 subordinates with veterinary qualifications. In addition, the staff of the veterinary college consisted of 12 officers.

The extensive work of the department is dealt with very informatively. Breeding operations are an important branch and cover a large field of activity.

The year was on the whole a healthy one and disease was controlled in a satisfactory manner.

The value of spleen tissue vaccine against rinderpest was successfully demonstrated on a large scale.

The number of veterinary hospitals increased to 299 and there were 1,100

outlying dispensaries at work. A large number of patients were treated at these popular institutions.

There was an increase in the number of students at the veterinary college, where a satisfactory year's work was recorded.

The research work at the college is extending and is becoming increasingly important. It is stated that more accommodation is now required.—G. K. WALKER.

TANGANYIKA TERRITORY. (1935). **Routine Work of Mpwapwa Laboratory and Some Research Notes.** [EVANS, S. A.]—*Rep. Dep. vet. Sci. Tanganyika, 1934.* pp. 20-26. 2 tables.

ROUTINE.

ANTI-RINDERPEST SERUM AND VACCINE PRODUCTION.—All field demands were met, the actual issues from the laboratory representing 93,875 doses (40 c.c.) of serum and 23,895 doses (10 c.c.) of vaccine. Minor laboratory products were prepared and issued as required by the field staff.

MORBID SPECIMENS.—1,779 specimens, mainly blood and organ smears, were submitted from outside sources for diagnosis and report. Some 70 to 100 smears from laboratory experimental animals are examined weekly.

RESEARCH NOTES.

EAST COAST FEVER.—An attempt was being made to correlate the presence of certain ticks with the incidence of this disease and a tick survey amongst local undipped native stock was in progress, identification being carried out by Dr E. A. LEWIS of Kabete.

ANAPLASMOSIS [PREMUNIZATION].—It was shown that inoculation with *A. centrale* alone did not confer sufficient protection against a virulent *A. marginale* strain introduced a year later, and so the technique for anaplasm premunization remains as heretofore, *viz*, an inoculation with the mild *A. centrale* strain followed within a few weeks by a second inoculation with the more virulent *A. marginale*. Photosensitization occurred in a grade ox during a very severe attack of anaplasmosis.

FOOT AND MOUTH DISEASE.—The history of a local outbreak was given in detail to emphasize the usual mild character of the disease as affecting native stock. By experimental transmission it was shown that only high-grade animals, as opposed to half-breds and natives, showed clinical symptoms.

CUCKOO-SPIT INSECTS.—Experimental feeding trials showed that there were no apparent grounds for the native belief that cucopid nymphs are poisonous.

PLANT POISONING.—A few notes on this subject are contributed [Mr H. E. HORNBY] and serve to emphasize the fact that this is no simple and straightforward problem.

WIREWORMS (*Haemonchus contortus*) IN CALVES.—Double dosing at an interval of three weeks with a 5 per cent. solution of copper sulphate, in doses ranging from 40 to 70 c.c., according to age and size, proved safe and efficacious.

Brucella abortus INFECTION IN CATTLE.—Medical and veterinary co-operation revealed a very interesting local supply of material for the study of bovine contagious abortion, and of undulant fever in man. Both conditions appear to be much more prevalent than heretofore suspected and investigations are proceeding on broad practical lines to ascertain the significance of brucella infection in general in the Territory.

TANGANYIKA TERRITORY. (1935). **Disease Control.** [LOWE, H. J.]—*Rep. Dep. vet. Sci. Tanganyika, 1934.* pp. 6-19. 2 tables.

" Eradication of rinderpest and contagious bovine pleuro-pneumonia, and the

local control of every other disease, whenever this is economically desirable ", summarizes disease control policy.

RINDERPEST.—Outbreaks were dealt with by methods which varied somewhat in detail, but were all based on the principle of the segregation of infected herds, and then the passing of the disease through them as quickly as was feasible.

11,875 vaccinations and 119,565 serum inoculations were carried out as part of the disease control policy.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA.—The eradicability of this disease is stressed, whilst the local native opposition to measures which have been successful elsewhere is not overlooked. Field experiments were continued with vaccine obtained from Kenya.

EAST COAST FEVER.—The complexity of this disease problem is emphasized (pp. 9-11) and the necessity for continued research. Field and laboratory experiments were conducted in which Dr E. A. LEWIS of Kabete co-operated.

TRYPANOSOMIASIS AND TSETSE FLY.—The control of the tsetse fly is considered the most important single factor in controlling the disease and the Tsetse Research Department have achieved results which enable such control to be effected where the expense is justified.

Correct early diagnosis of infection makes curative treatment a feasible procedure, when economically warranted, and several cases in different animals were so treated in many parts of the country. Native assistants can now carry out intravenous injections with tartar-emetic solution, a cheap and effective treatment.

ANTHRAX AND BLACKLEG.—These two diseases are discussed together owing to their very similar distribution. Light sporadic outbreaks were reported from most parts of the country. One unusually severe anthrax outbreak was associated with anti-rinderpest inoculations, presumably through infection from citrated blood used as a virus.

FOOT AND MOUTH DISEASE.—Outbreaks were reported from most parts of the Territory, but this disease is generally so mild that action is taken only in exceptional circumstances.

TUBERCULOSIS is not regarded as a major disease of cattle, and research by R. L. CORNELL appeared to show that bovine tuberculosis was a negligible factor in the incidence of the human disease.

HEARTWATER.—The incidence of this disease would appear to be much greater than heretofore suspected, and may present a very serious problem in the future, should sheep farming ever be undertaken on a large scale.

Brucella abortus INFECTION OF CATTLE appears to have no general economic significance to native-owned flocks and herds. The subject is under investigation at the veterinary laboratories, particularly as regards the relationship of the infection to certain forms of undulant fever in man.

BOVINE REDWATER AND ANAPLASMOSIS.—Both diseases are regarded as of little economic importance as far as native stock is concerned. Imported stock require protective inoculation, and this can be arranged at the laboratories.

EPHEMERAL FEVER OF CATTLE.—Though it is not of major importance, stock-owners are once more reminded of its existence and of the alarming symptoms sometimes produced. The disease occurs most frequently about the end of the main rainy season.

PLANT POISONING.—No reasonably sound data are available for estimating the economic importance of this complex subject. Feeding tests with suspected plants are carried out at the laboratories from time to time. The work carried out in South Africa and Uganda is appreciated.

DISEASES DUE TO WORMS AND BOTS.—The economic importance of internal

parasites is briefly discussed. A matter of considerable economic importance is the absence of " warbles ", and thorough examination of imported animals capable of introducing these parasites is stressed. Liver fluke caused a serious mortality amongst cattle in one particular area, but does not appear to affect sheep and goats to any serious extent.

Ophthalmia.—Outbreaks frequently occur, but further research is required to place the knowledge of these eye diseases on a sounder basis.

Skin Diseases.—Follicular and sarcoptic mange and streptotrichosis are regarded as the most important diseases encountered. Their economic importance lies mainly in the damage caused to hides and skins.

Diseases of Equines in General.—Trypanosomiasis (in the presence of " fly "), horse-sickness and both forms of contagious lymphangitis are prevalent, but there are limited areas where horses may be kept with comparative safety. Donkeys may be kept without much trouble in every part of the Territory which is " fly " free.

Diseases of Pigs in General.—No cases of swine fever were recorded and, outside " fly " areas, pigs could be kept without undue risk.

Diseases of Poultry in General.—Poultry farming appears to be attended by little more in the way of disease than in any other country. Fowl typhoid and fowl pox took their usual toll from native flocks.

Diseases of Dogs in General.—No case of rabies was recognized in dogs or in other animals. Distemper appeared to be prevalent. Biliary fever is prevalent but usually yields to treatment by trypan blue injections. Ancylostomiasis was reported to be showing an increasing incidence; treatment with proprietary preparations of carbon tetrachloride proved successful. Another interesting condition reported was venereal sarcoma.

Meat Inspection.—The carcasses of 16,802 cattle, 26,262 sheep and goats, and 526 pigs came under review and nearly 5 per cent. of the ox carcasses were condemned. There was an actual and relative increase in the number of condemnations for " measles " (*Cysticercus bovis* infestation), but otherwise little change from the general statistics of previous years.—S. A. Evans.

Northern Rhodesia. (1934). **Department of Animal Health. Annual Report for the Year 1933.** [Morris, J. P. A.] pp. 71. 1 table, 2 appendixes. Livingstone: Govt. Printer. [fcp].

The veterinary staff numbered nine, which left one area without a district veterinary officer.

The animal disease situation was good all round: there was an outbreak of foot and mouth disease in Barotseland in September which was controlled by a standstill order for stock. Contagious bovine pleuro-pneumonia remained, as in past years, confined to the Barotse province.

Brief reference is made to all the infectious and parasitic diseases of livestock which occur in the colony. A scheme was approved for the control of rabies involving the employment of European dog licence officials, who would also shoot stray carnivora, but this scheme was not put into effect owing to the economic situation.

Senkobo skin disease was more prevalent than in 1932: it is curable, if not spread over the body, by mange dressing.

Census figures for cattle from 1928 to 1933 are given: in 1933 there were 110,600 European-owned and 402,000 native-owned cattle.—J. E.

NORTHERN RHODESIA. (1934). **Report of the Assistant Veterinary Research Officer.** [LE ROUX, P. L.]—*Rep. Dep. Anim. Hlth N. Rhod., 1933.* pp. 28-71.

Conditions of work in the research department changed considerably, owing to the lack of funds and to the reduction in staff. Practically no research was done as a result and this report takes the form of a detailed description of the routine work under the new conditions. A full report of the animal breeding work and of the important diseases of the various species is given.

[This section is not abstractable owing to its length and diversity: it serves as a handbook on animal husbandry and animal diseases in Northern Rhodesia, when read in conjunction with the report of the Director of Animal Health. The entire report for this year is twice its normal size].—J. E.

JAMAICA. (1935). **Report of Government Veterinary Surgeon [for 1934].** [LOCKETT, S.]—*Rep. Dep. Agric. Jamaica, 1934.* pp. 12-20.

The year was favourable for livestock owing to the good rainfall. There was, however, much economic trouble in the livestock industry.

STOCK FARM AT HOPE.—After being free from tuberculosis since 1930, the herd of 400 cattle showed 14 reactors in June, advanced lesions being found in four of them. At a retest in November seven reactors were found. Bovine contagious abortion gave very little trouble during the year. One case of piroplasmosis occurred.

STUD FARM AT GROVE PLACE.—Psoroptic mange in equines continued to occur, mostly as the result of the admittance of affected brood mares. Lime-sulphur gave better results in its treatment than sodium arsenite. No cases of bovine tuberculosis occurred in the herd of 150 animals.

Detailed information about the diseases of individual animals is also given. —J. E.

COUNTY OF DUMFRIES (GREAT BRITAIN). (1936). **Annual Report of the County Veterinary Inspector for the Year ending 31st December, 1935.** [SANGSTER, G. A.] pp. 10. 3 tables. [Mimeographed] [fcp].

The general improvement in milk production continues to be maintained and there is also a tendency for milk producers, especially in the northern part of the county, to build up and maintain self-contained herds. The number of cows in the county area is 18,576 and in the burghs 94; 1,299 visits to inspect cows and premises were made. Excluding tuberculosis, 976 cases of disease were found on clinical examination.

TUBERCULOSIS ORDER, 1925.—166 cattle were slaughtered under this Order on registered premises; of these, 65 were "advanced" and 101 "non-advanced". Out of 230 samples of milk examined microscopically for the presence of tubercle bacilli, 7 were positive; one out of 67 examined biologically was positive. The 8 animals responsible were slaughtered.

MILK (SPECIAL DESIGNATIONS) ORDER (SCOTLAND) 1930.—The number of graded herds is as follows:- "Certified", 1; "Grade A (T.T.)", 33, and "Grade A", 2.

A final section deals with the work of the veterinary staff in connexion with meat inspection.—J. C. WALLACE.

I. COUNTY OF MIDLOTHIAN (GREAT BRITAIN). (1936). **Report of the Work done in the County of Midlothian under the Diseases of Animals Acts and Orders from 1st July to 31st December, 1935.** [MACRAE, W. D.] pp. 5. [Mimeographed] [fcp].

II. County of Midlothian (Great Britain). (1936). **Report of the County Veterinary Inspector under Milk and Dairies (Scotland) Act, 1914, for Year 1935.** [Macrae, W. D.] pp. 16. 7 tables. [Mimeographed] [fcp].

I. Apart from tuberculosis, no notifiable diseases were confirmed during the period covered by the report.

Tuberculosis Order of 1925.—Twenty-seven animals were dealt with under this Order and, of these, seven were found at routine inspection. Three cows were dealt with as a result of reports from the City of Edinburgh Veterinary Department. The animals slaughtered came under the following categories :– tuberculosis of the udder, 2 ; tuberculous emaciation, 1, and chronic cough with definite clinical signs of tuberculosis, 24. Two summaries are attached giving details of bacteriological examinations undertaken, and of notifiable diseases investigated, for the second half of 1935 and for the whole year.

II. During the year, dairies in the county were visited at least three, and those in the burghs four, times. About half the herds are " flying herds ", but there appears to be a tendency to retain cows and breed from them.

The average number of cows in the county area is 5,556 and in the burghs, 196. Excluding tuberculosis, 718 diseased or abnormal cows were found in dairy herds.

Tuberculosis Order, 1925.—Fifty-four cattle were dealt with during the year under the following categories :– tuberculosis of the udder, 7 ; tuberculous emaciation, 3 ; excretion of tuberculous milk, 1, and chronic cough with definite clinical signs of tuberculosis, 43.

Milk (Special Designations) Order.—At the end of 1935, there were three " Certified ", two " Grade A (T.T.) " and two " Grade A " herds in the county.

The report concludes with appendixes giving details of investigations in connexion with bulk samples of milk which contained tubercle bacilli, bacteriological work and records of work in connexion with meat inspection.—J. C. W.

County of Lanark (Great Britain). (1936). **County Veterinary Officer's Report for the County of Lanark and the Burghs of Biggar and Lanark for the Year 1935.** [Weir, J.] pp. 19. 2 appendixes. Glasgow : Robert Anderson & Sons, Ltd. [8vo].

Tuberculosis Order of 1925.—Notification was received of 544 cases : of these, 421 were slaughtered under the Order, of which 244 were detected on routine inspection. The number of cases in each category covered by the Order was :– tuberculosis of the udder, 102 ; giving tuberculous milk, 18 ; tuberculous emaciation, 37 ; chronic cough and showing definite clinical signs of tuberculosis, 264.

Milk (Special Designations) Order, 1923.—The number of herds licensed to produce milk under this Order was as follows :– " Certified ", 16 ; " Grade A (T.T.) ", 46, and " Grade A ", 3.

Milk and Dairies (Consolidation) Act, 1915.—Sixteen notifications were received that bulk samples of milk contained tubercle bacilli. As a result of investigations made, 29 cows were dealt with under the Tuberculosis Order.

Milk and Dairies (Scotland) Act.—Inspection of cattle : registered dairies were examined three times a year and exempted premises once a year.

—J. C. Wallace.

Cumberland County Council (Great Britain). (1936). **Annual Report of the County Veterinary Officer for the Year 1935.** [Simpson, R.] pp. 30. 1 table, 3 appendixes. Carlisle : Steel Bros. (Carlisle), Ltd. [8vo].

Milk and Dairies Order, 1926.—2,728 routine visits were made to registered

premises; herds licensed for the sale of "Grade A" milk are inspected four times a year and herds not accredited, but supplying schools, three times a year.

MILK AND DAIRIES (CONSOLIDATION) ACT, 1915.—Four notifications under Section IV of the Act were received from outside the county, and 13 cases of tuberculous infection in milk were detected as a result of milk sampling within the county. The necessary enquiries were made.

MILK (SPECIAL DESIGNATIONS) ORDER, 1923.—There are 7 "Certified", 15 "Grade A (T.T.)" and 197 "Grade A" milk producers in the county.

TUBERCULOSIS ORDER, 1925.—Disease was reported on 266 premises and found to exist on 212 of these. The following types of tuberculosis were found:– tuberculosis of the udder, 34; tuberculous emaciation, 83; chronic cough with definite clinical signs of tuberculosis, 106.

ANTHRAX.—Eighty-five reports of suspected anthrax were received and disease was confirmed in five cases.

SHEEP SCAB.—Eleven outbreaks were confirmed, five of them being due to imported sheep. Compared with 1934 (44 outbreaks), and 1933 (61 outbreaks), this is a marked decrease.—J. C. WALLACE.

WEST SUSSEX COUNTY COUNCIL (GREAT BRITAIN). (1936). **First Annual Report of the Chief Veterinary Officer 1935-36.** [JORDAN, L.] pp. 44. 22 tables. Chichester: Willis. [8vo.]

ANTHRAX.—Several cases of sudden death in cattle and pigs were reported, but only two were confirmed as anthrax.

TUBERCULOSIS.—341 cases were dealt with; of these, 151 were reported by owners or practitioners and 190 were found on routine inspection or during Milk and Dairies (Consolidation) Act enquiries. The cases are classified as follows:– tuberculosis of the udder or excretion of tuberculous milk, 77; tuberculous emaciation, 85, and chronic cough with definite clinical signs of tuberculosis, 179.

MILK (SPECIAL DESIGNATIONS) ORDER, 1923.—There are 11 "Certified", 17 "Grade A (T.T.)" and 305 "Grade A" herds in the county.

MILK AND DAIRIES (CONSOLIDATION) ACT, 1915.—Twenty notifications of milk containing tubercle bacilli were reported by various Medical Officers of Health and dealt with under this Order. In addition, 14 notifications that carcasses in abattoirs had been found affected with tuberculosis were received and visits to premises of origin made.

MILK AND DAIRIES ORDER, 1926.—Practically all registered dairy herds were inspected three times during the year; this involved approximately 3,400 visits.

TUBERCULIN TEST.—There is reference to a small-scale experiment started to ascertain if cattle can become supersensitive to tuberculin as the result of a previous test.—J. C. WALLACE.

DENMARK. (1936). Aarsberetning fra Veterinaerdirektoratet for aaret 1934. [**Report of the Veterinary Directorate, Denmark, for 1934**]. [PETERSEN, G.] pp. xvi + 223. 32 tables, 1 map, 7 charts. Copenhagen: Trykt hos Handrup & Wunsch. [8vo].

INFECTIOUS DISEASES.

ANTHRAX.—There were fewer outbreaks in 1934 than in former years, only 30 being reported. Thirty-eight head of cattle, one horse and four swine were affected. Three human beings contracted the disease through handling carcasses; one case was fatal.

FOOT AND MOUTH DISEASE.—In 1929 the country was quite free. Then the disease broke out on the islands of Lolland and Falster and was at its height in

May, 1933. It continued to spread until the end of April, 1934. From November, 1933, onwards all but two infected herds were slaughtered. From April to October, 1934, the country was free from the disease, then three outbreaks occurred in different parts of the country. One herd was probably infected by a cow from one of the two above-mentioned herds which were not slaughtered. No outbreaks occurred from December, 1934, to November, 1935, when a number of cases were reported coincident with a rather wide-spread epizootic in the northern districts of Germany.

CONTAGIOUS FOOT-ROT IN SHEEP.—This disease was reported in 56 flocks, mainly in the southern and western parts of Jutland. Cases which occurred in other parts of the country could be traced (through the purchase of sheep) to flocks in that area. Twenty-three flocks were slaughtered and the disease is now localized to the environs of Tønder, a city in the south-western part of Jutland.

INFECTIOUS PARAPLEGIA OF HORSES [see this *Bull.* **6.** 608.] was diagnosed on eight farms.

INFECTIOUS PHARYNGEAL PARALYSIS of cattle was reported in ten herds; the mortality was 82·6 per cent. [here also see this *Bull.* **6.** 608].

SARCOPTIC MANGE occurred on 12 farms. Only a few horses on each farm had been infected when treatment was introduced.

No other serious infectious diseases were observed in 1934. Such diseases as purpura haemorrhagica, contagious pustular stomatitis, strangles, blackleg, malignant catarrh in cattle and some other infectious conditions are mentioned. The numbers of infected herds and animals are given in tables, and graphs illustrate the number of cases reported through a series of years. Cases of poisoning and other pathological conditions reported by veterinary surgeons are mentioned.

TUBERCULOSIS.—366 animals with udder infection and 652 with uterine infection were slaughtered in accordance with the law. 6,834 herds (140,313 animals) were tuberculin-tested and the owners undertook to destroy reacting animals or to keep them isolated in accordance with Bang's system. 19,048 fresh herds (312,646 animals) were submitted to tuberculin tests. By August, 1935, 37,144 fresh herds had been tested; 25·7 per cent. had no reactors, 14·5 per cent. had one, 16·6 per cent. had one or two reactors and 43·2 per cent. had more than two reactors. A total of 792,407 tuberculin tests were carried out in 1934.

—H. C. BENDIXEN (COPENHAGEN).

BULGARIA. (1935). La service vétérinaire en Bulgarie de 1929 à 1933. [**The Veterinary Service in Bulgaria from 1929 to 1933**]. [PAVLOV, G.]—*Bull. Off. internat. Epiz.* **11.** 2-52. 13 figs., 9 tables, 4 graphs.

In an introduction the author describes the primitive (in relation to other European states) pastoral life of Bulgaria and shows the necessity for a state veterinary service for all aspects of animal husbandry. An account is then given of the prevailing diseases and state veterinary organizations.

LIVESTOCK DISEASES.

ANTHRAX caused an annual average of 1,000 deaths in domestic animals between 1929 and 1933. Farmers are encouraged to report sudden deaths in their stock by liberal compensation for losses from anthrax. Vaccination and sero-vaccination are employed.

BOVINE TUBERCULOSIS.—Provision for control was made by a law passed in 1924 enacting that diseased animals and those reacting to the tuberculin test should be slaughtered; suspected animals may only be sold for slaughter, which must take place under veterinary supervision; dairy cows and buffaloes must be tested annually (ophthalmic, confirmed by the subcutaneous test).

Up to 1924 the extent of bovine tuberculosis was unknown, but since then successively wider schemes for tuberculin testing have come into operation, and the latest information shows that an average of 3·92 per cent. of all cattle and buffaloes are tuberculous, steers showing a much higher incidence of infection than cows. In 1933 less than 2 per cent. of dairy cows and buffaloes were infected. By a law of 1933 all classes of livestock are included in the eradication plan, and compensation at 100 per cent. of the full value is paid for apparently healthy reactors and 75 per cent. for clinically diseased animals.

Swine Erysipelas is limited in area to a district adjoining Rumania, whence it is stated that infection spreads.

Glanders.—Ruthless eradication, with the help of the mallein test, had almost eradicated the disease by 1933, though it was wide-spread up to 1926.

Haemorrhagic Septicaemia was practically absent during the period under review.

Barbone [pasteurella infection] causes small losses in swine.

Blackleg was practically absent during the period under review.

Dourine was still in existence in 1933, 28 farms adjoining the Rumanian frontier being infected, but it is expected that strict control measures will soon effect its eradication.

Rinderpest has not been reported since 1913.

Bovine Contagious Pleuro-Pneumonia has never been recognized.

Foot and Mouth Disease is benign in Bulgaria and is caused by the O type of virus ; the number of infected animals has fluctuated between 325 and 127,632 between 1930 and 1932 ; in 1933 the number was only 12,805.

Swine Fever has caused heavy losses in recent years and has not decreased much, in spite of fairly stringent regulations including a compensation scheme. In 1933, 247 farms (6,500 pigs) were infected, with a mortality of 42 per cent.

Sheep Pox used to be wide-spread and caused the death of 3,000 sheep in 1929 ; it was almost absent in 1932, but the incidence increased in 1933 when 31 flocks were affected, 148 sheep dying and 403 being slaughtered. The sensitized vaccine of Bridré and Boquet has been widely used.

Rabies was wide-spread five years ago and required most stringent control measures owing to the enormous numbers of village and country dogs. Dogs are now registered and taxed, and strays are destroyed, no less than 185,355 being killed in 1933. 2,400 persons were vaccinated after being bitten by dogs.

Sheep Scab was not reported during the period under review.

Infectious Pleuro-Pneumonia of goats has been absent since 1921.

Poultry Diseases are economically very important, as poultry exports are the chief live or dead stock exports of Bulgaria. Fowl cholera is the chief disease and sero-vaccination is used to a large extent. " Poultry dysentery " [? fowl typhoid] and fowl pox are also important.

Veterinary Institutes.

A brief description is given of the central veterinary bacteriological institute at Sofia, and of the two provincial and the six departmental ones.

State Veterinary Service.

All veterinary treatment is free and is provided by the state, as the peasantry live in a state of poverty. There are now 300 veterinary hospitals, 150 being of recent construction and provided with living quarters for the veterinarian in charge. This service is under a department of the Ministry of National Economy. 44 per cent. of animals treated are horses and only 29 per cent. are cattle.

MEAT AND MILK INSPECTION SERVICE.

About 300 abattoirs have been constructed since 1924 and all meat issuing from them is used for home consumption. The numbers of animals slaughtered between 1929 and 1933 are given. Tuberculosis was found in over 1,000 animals out of the total of 2,313,000; in 1933 0·3 per cent. of 98,000 pigs were infected with trichinae, and 0·78 per cent. with cysticerci.

Milk for human consumption in the towns is controlled at central dairies.—J. E.

BOOK REVIEWS.

JENNINGS, H. S. [Henry Walters Professor, Zoology, and Director, Zoological Laboratory, Johns Hopkins University]. (1935). **Genetics.** pp. 351. 70 figs. [Numerous refs.] London: Faber & Faber Ltd. [8vo] [15s.]

It is probably fair criticism to say that the majority of text-books which have been written on the subject of genetics have either been so simple as to be unimpressive, or have been too abstruse to be readily appreciated by the average scientific reader. This book, by Prof. Jennings of the Johns Hopkins University, seems to have achieved the mean between these extremes. The book has been written with the deliberate intention of avoiding any distinctions between heredity and the mechanisms on which heredity depends. It has been written so that the average educated reader may use it and may acquire from it a sound conception of what genetics is, what it has to offer, and what are its limitations.

It is impossible in a short review to present a résumé of the contents, but it is desirable to indicate the general type of structure. The reader in the first chapters is led cautiously and gently through fundamental genetic conceptions. The earlier examples used to illustrate genetic truths are not entirely taken from *Drosophila*, although, just as it is impossible to read without a knowledge of the alphabet, so it is impossible to understand genetics without a knowledge of inheritance in this amazing insect, and the author makes full use of experiments in drosophilology to prove his points. The action and the activity of chromosomes in their influence on the characteristics of the anatomy, physiology and psychology of the individual are described, and the methods of inheritance are discussed. From this stage, the step to a consideration of linked characters and genes is an easy one. After a consideration of the almost bewildering list of characters which are inherited independently, each the result of a gene in action, the lay reader will without doubt emerge with a very healthy idea of exactly what a gene is and of how essentially important is the unit character.

In the later chapters, the author to some extent abandons the clear precise consideration of actual facts which has been followed in the first and middle parts, and allows himself to become a little more diffuse and even hypothetical. Those aspects of genetics with which he deals, however, preclude precision. Subjects such as recombination, transformation, lack of permanence of types, influences of domestication, and the many other aspects of genetic variation do not readily lend themselves to any other treatment.

It is well to indicate that the book is one of fundamental genetics and not of applied genetics. The veterinarian with some specific genetic question to decide may not find the work suitable for reference, but the student who is prepared to read the book conscientiously and carefully will acquire a very sound foundation of genetic knowledge upon which to build further.

The format of the book is perhaps hardly worthy of the matter it contains. Some few printer's errors might have been corrected, and some of the diagrams

suffer from the comparatively inferior quality of the paper. These matters are not, however, of primary importance.—WM. C. MILLER.

VELLARD, J. [Lauréat de l'Institut et de l'Acad. de Médecine]. (1936). Le venin des araignées. [**Spiders' Venom**]. pp. 311. 63 figs., 5 tables. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr.45].

The author of this monograph – one of the series of monographs of the Pasteur Institute – has spent his scientific life as doctor and zoologist in Brazil, and has made a special study of the spiders of South America with particular reference to those which are poisonous, their effects on animals and man and the immunology and serotherapy of spider bites. The literature on the subject is well covered.

There are three parts; the first comprises a historical review and chapters on the nature and action of spider venom; the second deals systematically with the dangerous spiders of South America and the third with serotherapy and immunization.

The 15-page bibliography is divided into sections dealing with the literature of various countries, but there is no index.

The historical section contains many references to alleged or actual cases of naturally contracted spider bites in domestic animals, but there are very few new original records of such occurrence. On the other hand, there is abundant information on the experimental action of spider venom on laboratory animals, dogs and cats, and the author used sheep for the preparation of antiserum.

The book will be very useful for reference purposes when suspected cases of spider bite are being investigated and it can be recommended as a competent authority in this field.—J. E.

BRACHET, A. [Revised by DALCQ, A., & GÉRARD, P.] (1935). Traité d'embryologie des vertébrés. [**The Embryology of Vertebrates**]. pp. viii + 690. 603 figs. [Numerous refs.] Paris: Masson et Cie. [2nd Edit.] [8vo] [Fr. 130].

The second edition of this book, which was begun by Brachet in 1930, now appears in an entirely revised form, the work of Dalcq and Gérard, who completed the task on the death of their teacher.

Following a brief introduction, the treatise is divided into two main parts. The first part deals with general embryology and is subdivided into four sections. Section 1 is of particular interest: it gives a clear, comprehensive account of the sex cells and fertilization in vertebrates. The second and third sections deal with the formation of blastula and gastrula respectively. The final section is devoted to the formation of the mesoblast and mesenchyme, the development of the vascular system, and the formation of the foetal membranes and placenta.

The second part is devoted to special embryology and consists of two sections, dealing with the head and the trunk (including the limbs) respectively.

At the end of each of the 26 chapters is a list of the most important references. There is an alphabetical list of the authors cited in the text, and an index which appears to be free from any serious omissions. The book is profusely illustrated with drawings which are for the most part not original.

For the student of embryology and many laboratory and other workers, the volume will doubtless continue to form an invaluable text-book and work of reference.—E. G. WHITE.